

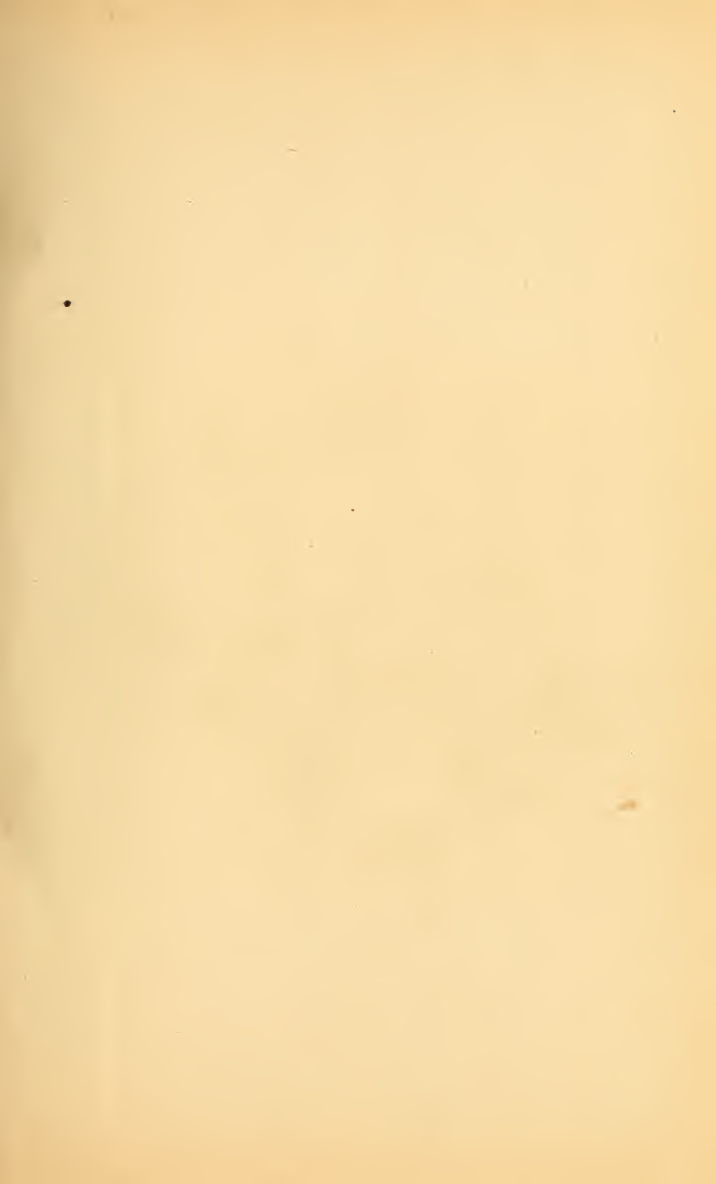
THE ROMANCE OF BIRD LIFE



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THE ROMANCE OF
BIRD LIFE



WHITE STORK AND HIS PLAYMATES

The Stork's favourite amusement was to join with children in a game of catch, running after them in the street and seizing their jackets with its bill, and allowing itself in turn to be caught by the wing (*page 120*).

White Storks are great favourites in Holland and Germany, where they often nest on roofs and chimneys.

THE ROMANCE OF BIRD LIFE

BEING AN ACCOUNT OF THE EDUCATION,
COURTSHIP, SPORT AND PLAY, JOURNEYS,
FISHING, FIGHTING, PIRACY, DOMESTIC
AND SOCIAL HABITS, INSTINCT, STRANGE
FRIENDSHIPS AND OTHER INTERESTING
ASPECTS OF THE LIFE OF BIRDS

BY

JOHN LEA, M.A.

JOINT AUTHOR OF

"THE ROMANCE OF ANIMAL ARTS AND CRAFTS," &c. &c.

WITH TWENTY-SIX ILLUSTRATIONS



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THE ROMANCE OF BIRD LIFE

CHAPTER I

NURSERY DAYS AND EDUCATION

The hatching of a chick—How the egg-shell is cracked—The ‘egg-tooth’ and its uses—Different ways of escape from the shell—Helplessness and precocity : Parrot and Partridge—Instinct—How to distinguish instinctive actions—Life within the egg—Obedience of the unborn chick—Chicken language—Fearlessness of young birds—Playing ‘possum’—Protective colouration—Early feats of skill—Learning to peck—Food and experience—Learning to drink—The flight instinct—Parental discipline—Swimming and diving—Young water-birds which are launched by their parents—Protection of nestlings—Learning to sing—Nest-building—Nests and eggs—Early misdeeds : Cuckoos and their victims—Instinct and education.

NOWHERE in the wild range of animal life is there a greater wealth and variety of romance than amongst birds. In their loves, their battles, their adventures, in all their varied activities and social habits, there is present that curiously pervading charm which constitutes, for those who have not had the misfortune to become deaf to its appeal, the very true spirit of romance. Nor is the element of mystery, which is so often bound up with romance, wholly wanting, for there is still much in the life of a bird that we cannot explain or understand, in spite of the great progress which science has made towards the far-off goal of complete knowledge.

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Before we reach the end of our story we shall have occasion to make the acquaintance of birds of many kinds, some of them, it may be, but little known even to naturalists; but we will bear in mind that interesting birds are not necessarily rare, and that there is abundance of romance in the life of species with which we are all quite familiar—so familiar, perhaps, that many people never take the trouble really to observe them at all. For the moment we need not go far afield—no further than to the fowl-pen.

The interest of a bird's life story begins with the very earliest days while the chick is still in the egg, unborn, and there is no reason why we should not take that as our starting-point; indeed, if we do so, we shall meet at once with some of the most remarkable and beautiful instances of the way in which Nature has made provision for carrying on her work of aiding and safeguarding the appearance on the earth of a new living creature.

What could be more commonplace than the hatching of an ordinary domestic chick? For three weeks or so the Hen broods over her eggs, and then one day she appears with a family of fluffy, cheeping youngsters about her, over which she fusses inordinately until they are able to look after themselves. If all goes well, they are, in due course, ready for the table, or to have nests of their own; and there very often the interest of their owner ends. Let us, however, watch the hatching of a chick and see if we cannot find out about it something more that is worth knowing. It is not possible, of course, to do this in ordinary circumstances, that is to say, while the egg is covered by a sitting Hen; we must either wait until several of the brood have escaped from the shell, when it is likely that the others are on the point of emerging, and remove one of the unhatched eggs to a warm place, such as a basket in front of the fire, where we can observe it conveniently; or, what is far better, watch eggs which are being hatched in an artificial glass-covered incubator. In either case a great deal of patience

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may be called for, but we are not likely ever to learn very much about the ways of birds without that.

Let us suppose, then, that the eggs are hatching, and that we fix our attention on one which has still an unbroken shell. If we have been fortunate in our choice we shall probably see the egg moving a little from time to time, and if we listen intently we may hear a feeble tapping, caused by the chick hammering upon its prison walls in its efforts to escape. The sounds are not continuous; there are frequent pauses, some of them quite long, so we may suppose that the little prisoner finds its task a tiring one, and is obliged to rest from time to time. After a while, however, there appears in the shell a crack which grows gradually larger, until at length a piece is pushed right out, or the shell is broken quite in halves, and the chick is visible. It presents a rather pathetic, woebegone appearance, for its downy covering is bedraggled with moisture. Now and then it moves in a jerky way, opens its eyes, and makes heroic efforts to hold up its head, but it is not very successful in its attempts, for the eyes keep closing again, while the head slowly sinks to the floor. The little bird, indeed, seems to be in the last stage of exhaustion.

Gradually, however, the chick gathers strength, its down-feathers become dry, it practises raising itself on its feet, and it is not very long before it has learnt to stand up. Looking at it now, it appears much larger than it did just at first, and one is disposed to marvel that it could so recently have been shut up in such a narrow space. Certainly it had not very much room in which to move about, and its hammering on the hard shell must have been performed at a considerable disadvantage. It seems rather wonderful that it should have managed to escape at all: but perhaps the little beak is very hard and sharp? No, it is still quite soft; but if you look at it closely you will see at the very tip of the upper half of the bill a pale spot, and there is the instrument which Nature has provided to enable the chick to gain its freedom. It is a tiny

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conical nodule of chalky substance, which is formed as the time for hatching approaches, and is known as the 'bill-scale' or 'egg-tooth.' As the chick moves its head about this instrument acts as a file, and gradually scrapes and weakens the shell where it rubs against it; then, when the time for more active measures arrives, it makes the feeble blows which the little bird delivers on the wall of its narrow prison far more effective than they would be if struck by a soft bill without any such armature. The 'egg-tooth' has no other use: when once the chick has emerged its work is done, and it soon disappears.

We ought, perhaps, to mention that the shell is not broken open in just the same way by all the different kinds of birds, for while many, like the domestic chick, gather sufficient strength after chipping a hole and breathing the air for a little while to burst open their prison walls, others, such as Ducks, chip the shell in a circle near the broad end, or, like the Humming-birds, make a clean, smooth cut round four-fifths of the equator before hooking their claws over the edge and pushing the two halves apart.

The domestic chick, then, is clothed when born in a coat of down; its eyes are open, and it is very soon able to stand on its feet: what else it can do we shall learn presently. The young of many birds, such as those of Gulls, Ducks, Plovers, Cranes, Ostriches, and so on, are equally advanced, and some of them are even more precocious.

But the young of another great group of birds, among which are Parrots, Hawks, Herons, Doves, Gannets, Crows, and all our song-birds, are more or less helpless when hatched, and many (though not all) of them are blind and naked. Being unable to leave the nest or to look after themselves in any way, they are entirely dependent on their parents for food and even, in the early days, for warmth.

When we come to inquire into the matter more closely, we find that the most highly developed and intelligent birds are

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the most helpless at birth. A baby Parrot, for example, is unable to open its eyes for a week or more after escaping from the egg, and cannot leave the nest for at least thirty days—in the case of some of the larger Parrots it may be seven weeks. Even when it has learnt to fly it is still lovingly tended by its parents, and for some time longer is fed only on seeds which they have softened for it in their crops. What a contrast is this to the precocity of a young Sandpiper, which is able to run about almost as soon as it is born, and after an hour or two can cover the ground at an astonishing pace; or of a Partridge chick, which can jump over an obstacle four times its own height when only two or three days old!

The first thing which chicks endeavour to do is to discover a snug place where they can nestle close for warmth. In nature the little birds find this under their mother's wing, and in the incubator they huddle together; but in all circumstances they instinctively seek warmth, and they soon learn by experience where it is to be found, for hand-reared chickens will run to the hand of the person who tends them, and cosily ensconce themselves there, settling down in contentment and poking out their little heads between the fingers.

This brings us to one of the most interesting questions in bird-life: How far is a young bird guided by instinct, and to what extent are its actions due to experience and education? We cannot discuss it very fully here, for it is a difficult and complicated question, and one concerning which we have still a great deal to learn, although whole volumes have been written about it. I hope that some day you will read some of these books, especially those about *Animal Behaviour* and *Habit and Instinct*, by Professor Lloyd Morgan, which are more fascinating than any story-book. For the present we must be content with quite a short account of the matter.

We may say at once that birds are guided in their actions by both instinct and intelligence, but that with them instinct is the more highly developed of the two, while in man the exact

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opposite is the case. A simple and fairly safe way of deciding whether what an animal does is the result of instinct or of intelligence is to inquire whether, in the same circumstances, it is done in the same or nearly the same way by all the individuals of the same species, age, and sex, without any previous experience to guide them. If so, the action is almost certainly the result of instinct, because there is a want of variety about actions which are truly instinctive which is very different from what we find in the case of rational actions. If you have ever kept silkworms you know that when the caterpillar has eaten a certain quantity of lettuce or mulberry leaves, it crawls into a corner and begins to spin a cocoon. There seems to be no particular reason why it should want to do anything of the kind; its surroundings are just the same as ever; it has the run of the same cardboard box, in the same exhilarating air of a school locker, with the same liberal supply of rather limp lettuce leaves; yet it appears suddenly to have tired of its sybaritic existence, and to be moved by some impulse from within to start spinning. That act is truly instinctive. There are other instinctive acts, however, which are not performed until some change takes place in the conditions to which the animal is exposed. Let us this time take the case of a bird by way of example. If you place a young Duckling, not very long out of the shell, in a pan of water, you can see it begin to paddle with its little legs and swim about on the top: that is an instinctive act brought about by exposing the bird to new conditions, or following, as we say, an external stimulus.

Most instinctive acts are either vitally important for the welfare of the race, like the silkworm's cocoon-spinning, which provides it with a cosy garment to protect it while it is in the helpless chrysalis condition; or, like the Duckling's swimming, they follow some external stimulus of frequent occurrence.

Chickens may often be heard cheeping while they are still in the shell, in some cases quite a long while before hatching. Ducklings begin their musical career about a day before they

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make their appearance in the world, and young Moorhens as much as two days. The sound is sometimes quite spontaneous, but a silent eggling can often be induced to chirp in answer to a whistle. Now it has been noticed in more than one instance that if the mother utters a note of warning while the little prisoner is hammering away at the shell and singing (or is it complaining?) over its work, the sounds stop instantly, and the chick keeps quite still for a long time unless the old bird utters a different call which evidently means that the danger is past. That teaches us that the simple language of call-notes is certainly instinctive, for the chick within the egg cannot possibly have learnt their meaning by experience. Domestic chicks have at least six different call-notes, all expressing different meanings: a gentle piping of contentment, a low double note of enjoyment heard when the little bird is caressed, a cheep of discontent when it wants food or company, a squeak of protest when it is handled against its inclination, a shrill cry of distress when it is taken away from its companions, and, lastly, the peculiar danger cry. The danger cry seems to be a universal language, for it is understood by young birds of other species.

It is very important indeed that young birds should understand the parents' danger signals, because they seem to have no instinctive fear of any animal which approaches them quietly. If you are very gentle in your movements, you may feed nestlings without their showing signs of alarm unless their parents are present to utter a note of warning; and most people who have a cat and a garden are aware how frequently pussy is allowed by young birds to approach dangerously near, in her quiet, stealthy way, with fatal results. As for dogs, Professor Lloyd Morgan gives a most amusing instance of the natural absence of fear of them amongst young birds, in the case of his fox-terrier, which had been trained to be on his best behaviour and always to remain perfectly calm in the presence of chicks. As a result of his self-restraint the dog was treated with the utmost familiarity by all sorts of young birds: a Wild Duck

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nibbled his lips ; Plovers, Pheasants, and Partridges pecked his nose ; and an ordinary chicken two and a half days old crept in under his body, and finding it nice and warm, cuddled down there ! Now, if the parents of any of these little birds had been present they would at once have called their chicks away from such a dangerous acquaintance as a dog, and having been warned the little ones would afterwards have treated those animals with respect. That is an instance of the manner in which education often takes the place of instinct.

(The promptness with which young birds obey their parents' warning cry in the presence of danger is very remarkable. If an old Pheasant be surprised while jauntily leading a string of fluffy chicks from a hedgerow into the open, it will itself, after uttering notes of warning, immediately disappear into the nearest cover. Not so the little ones ; they instantly stand as motionless as if they were turned to stone, each one in the exact position in which it happened to be at the moment when the signal was given, and though you pass within a yard of them they will probably make not the slightest movement nor in any other way betray their presence. As soon as the danger has passed the old bird will rejoin her family and take charge of them again.

(The instinct to remain motionless in order to avoid being seen is a very common one amongst chicks which are hatched on the ground and begin to run about almost immediately. Such chicks are clothed in down which usually matches the colour of their surroundings, and so may easily escape notice. This is called 'protective colouration.' Often there are stripes, patches, bands, or collars of a lighter or darker colour than the rest of the down, which aid the deception by making the owner look like two or more separate objects, such as stones or little lumps of earth, lying on the ground. Unlike the Pheasant chicks mentioned above, most of these birds drop flat on the earth and crouch there with their necks pressed close down. In that position they are practically unrecognisable unless you catch their



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BABY OSTRICH LEAVING THE EGG

The baby ostrich is one of the most precocious of chicks, and can run about as soon as it escapes from the egg, sometimes literally carrying a portion of the shell on its back. When it is born its feathers look very much like the spines of a hedgehog.

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eye, and when they stand up again they seem to have appeared suddenly from nowhere.

Young Game-birds begin to practise standing on their feet very soon after they are hatched, and in a few hours can walk quite well. That is so even when they are hatched in an incubator, though in these circumstances they take about twice as long to learn as when they have a mother to look after them. Ducklings and Moorhens are more backward, and if they try to stand on one foot and scratch themselves with the other during the first day of their life they topple over, whereas an ordinary chicken can perform this feat of skill quite creditably.

Few young birds are more precocious than Ostrich chicks. These birds make their appearance from the eggs covered with a bristle-like growth which has very much the same appearance as the quills of a hedgehog, as you may see in the illustration opposite. They can not only run easily, but are quite capable of feeding themselves from the first, though it is said that they will not begin to pick up food unless they are taught to do so either by the old bird or by the person who has charge of them suggestively tapping on the ground in imitation of a bird pecking. It is certain that chicks of various kinds which have been hatched artificially can be induced in this way to begin feeding themselves, and the natives of Assam, who are in the habit of rearing newly hatched Pheasants which they find in the jungle, teach them to take their rice by tapping among it. It is said that without this help many would die.

But I think it is very likely that they would soon learn to help themselves, even if they were left to their own devices. At all events no such instruction was needed by a young chicken three days old, which until then had been kept carefully blindfolded. When the bandage was removed this little bird first of all sat and chirped for about five minutes, while it took a general view of the strange world in which it suddenly found itself. Very soon its attention was attracted by a fly some distance away; it then began pecking its own toes, and learnt to aim well so quickly

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that a few moments later, on making a dart at the fly, which had crawled within reach, it seized and swallowed it at the first attempt. It next tackled and disabled a hive bee; but at the end of twenty minutes it had still not moved a step. On being placed within sight of a Hen and her brood, however, the little bird showed that it could use its feet as cleverly as its beak, for after chirping for a minute or so it made for the family party as straight as possible over the rough ground, leaping over small stones and running round larger obstacles without a single blunder.

Young birds are always more quickly attracted by moving food, and that is why a Hen picks up and drops in front of her chicks the grains of food which she wishes them to eat, even when they have learnt how to peck. Nestlings whose food is placed in their mouths by their parents cannot be taught to pick it up from the ground like chicks until they are much older; as a rule, all that they can do is to open their mouths very wide and wait for it to be given to them. Young Moorhens, however, which are fed from their mother's beak at first, will peck upwards at anything that is offered to them, but not downwards.

When a young bird has learnt how to take its food, it has to learn by experience what is nice and what is nasty, what is good for it and what is not. Here the mother's guidance is of great assistance, for the chick seems to have no instinctive knowledge of these things; it will peck at anything that is not too large, whether it be its own toes or a small stone, its companions' eyes or a maggot. Like a puppy which will attempt to swallow almost any object which is not disagreeable to the taste, even a piece of string, until it learns better, the young chick will try everything, test it in its bill, and store up its impressions for future use. In the case of two things which both have the same appearance, but one of which is pleasant to the palate and the other distasteful, such as yolk of egg and orange peel, the chick's behaviour depends on which of the two

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is picked up first. If it be the nasty one, and it happens to have a very unpleasant flavour, probably nothing will induce the little fellow to taste the other which resembles it in appearance; but if he has the nice morsel first, he will afterwards probably try the nasty kind more than once before he gives it up in disgust; he is then, however, suspicious of the nice food too, and refuses it for some time, though he may eventually peck at it hesitatingly and give it another trial.

(It is just the same in the case of insect food; unless the mother is present to give warning, a chick has to learn by personal and perhaps painful experience what kinds may safely be eaten and what kinds have stings or are otherwise undesirable. But though young birds apparently have no instinctive knowledge of what is good to eat and what will lead to uncomfortable sensations, they are often preserved from painful consequences arising out of ignorance by a wholesome fear of anything big, especially if it buzzes. A bluebottle is as suspicious an object as a bee to a very young chick, who is often deceived by his noisy, blustering conduct into imagining that he is better left alone; but the deception does not last very long, and like other blustering fellows the fly is soon found out. A young Plover which will peck at a small worm is afraid of a big one. Old birds also are suspicious of anything of unusual size. If you have been in the habit of putting breadcrumbs on your window-sill for the Sparrows, try the effect some day of placing a large slice of bread there instead; it is quite likely that you will find the birds are shy and suspicious at first, and refuse to come near it until they have grown accustomed to such an unusual object and have made up their minds that it is not dangerous.

But although young birds are naturally cautious, they are of course further protected from the danger of taking improper food by their parents, who give them only what is good for them and often induce them to eat by making pretence of doing so themselves, just as a mother often persuades her child to eat

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his dinner by pretending to take a spoonful to show how nice it is.

Unless young birds are taught to drink by their mother, they generally seem to learn quite by accident—that is to say, however thirsty they may be they do not recognise water by sight, but only find out by experience that *that* is what they want. The discovery may be made in various ways—by pecking at a dewdrop, or at some speck or grain in the water, or at the edge of the water where it is in tremulous movement, or at a bubble ; the beak then becomes wet, and that seems to be enough to awaken the drinking instinct, for the little bird at once quenches its thirst after the manner of its kind. One chick will imitate another ; but if there is neither an old bird to teach them nor a more forward youngster to imitate, they have to find out for themselves what drinking is, and they find out accidentally.

Young Ducklings appear to be no wiser. If they are not in charge of their mother, they will walk about for some time in shallow water without taking any notice of it until one of them finds out suddenly that it is good to drink. It is very interesting to learn that even the dogs which were born during the *Discovery Expedition* in the far south, and had never seen water except in the frozen state, did not know in the least what to do with it when it was first offered to them. They had always quenched their thirst by eating snow, and they grew very thirsty indeed before eventually they were taught to drink by having their noses forcibly thrust into the water.

Though young birds, newly fledged, cannot fly either as quickly or as confidently as their parents, and skill only comes with practice, they begin to use their wings instinctively as soon as the feathers are large enough to support them in the air ; indeed, even before they are fledged they stretch out their little featherless wings if they feel themselves falling. Any one who cares to make a simple experiment with an ordinary chicken may see that this is so. The best way to do it is to

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take a chicken not more than a day or two old and place it in a basket ; then raise the basket as high as possible and suddenly lower it, and you will see the little bird at once open its wings, though they are not yet of the slightest use for preventing it from falling. A few days later the chicken not only spreads its wings, but flaps them as if in flight ; and if frightened while on the ground, it flaps them as it runs in trying to escape.

The early flights of young birds seldom carry them very far, but some kinds are more successful than others in their attempts. Young Swallows are perhaps as clever as any ; they launch themselves boldly from the nest, circling round and alighting again without a blunder. Others go through an elaborate course of training before they venture to attempt actual flight. Young Storks, for example, begin by moving round the edge of the nest flapping their wings ; then they take a little jump and learn to support themselves for a moment in the air, rising higher at each attempt, but taking care always to keep over the nest until they are able to remain in the air for half a minute or more. Having at length gained confidence by this kind of practice, they glide out boldly from the margin and indulge in short flights around their home, and eventually they get sufficient courage to take refuge on a neighbouring roof.

Occasionally fledglings are too timid to attempt to fly until their parents urge them to make an effort. Usually a little gentle encouragement is all that is required, with the offer of something nice to eat as an inducement. I have often watched Sparrows fluttering before their young ones with a tempting morsel held in the beak, uttering persuasive calls ; and Hawks frequently place the game which they bring home to their young just out of their reach when they are old enough to fly, and so tantalise them into taking their first lesson.

Persuasion, however, is not always effective in overcoming the young birds' timidity, and in that case their parents have to resort to sterner methods. Many a fledgling is compelled

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to take its first flight by being turned out of the nest, neck and crop. House-Martins are said sometimes to drag out their laggard children with their beak ; and such birds as Falcons and Eagles vigorously insist on their family leaving home as soon as they are old enough to look after themselves.

Water-birds, also, exercise a wholesome discipline over their young, in compelling them to practise swimming and diving. The young birds, however, are usually very precocious, and they never have to learn *how* to swim. Many of them are extraordinarily skilful in the art almost from the moment when they leave the egg. Young Moorhens swim before they can walk, and though their first strokes are rather sprawly, they soon get the correct Moorhen action. In South America there is found a bird called the Jacana (*Parra jacana*), whose habits are very similar to those of our Moorhen, but whose swimming powers at birth are even more remarkable, as Mr. Hudson accidentally discovered. On a certain occasion, while examining a Jacana's egg which he had just removed from the nest, he found that the shell was already chipped and the chick about to make its escape. The old birds were greatly excited, and poured out their loud cries with a sound very much like a policeman's rattle ; perhaps their calling stirred up the chick to make a great effort, for the shell suddenly parted and the young bird leaped into the water. Although that was its first moment of life outside the egg, it immediately behaved like a practised swimmer, stretching out its neck and paddling quickly to a neighbouring mound, where it hid itself in the grass, lying perfectly still like a young Plover.

A curious fact of which few people are aware is that ordinary domestic chickens a day old can swim quite well until their down becomes sodden, but as they grow up they lose this instinctive skill, and an adult Hen floats about and struggles aimlessly if she finds herself in deep water. It is a remarkable circumstance, too, that if young water-birds, such as Ducklings, are kept away from the water beyond the usual time for begin-

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ning to swim they rather shrink from it at first; the moment they get a ducking, however, the hereditary instinct is aroused and they know exactly how to behave—at all events when the first feeling of surprise has passed away. Those that are hatched in nests surrounded by, or close beside, the water usually take to an aquatic life almost immediately, while others are led down to the water by their parents as soon as they are old enough to undertake the journey. It is only the latter that require persuasion or compulsion before they will make the plunge. Young Penguins are not conducted to the sea until they have doffed their baby plumage, but when that time comes they are pushed rudely in by the old birds in spite of their protests. Eider-Ducks are introduced to their new element in a gentler and more scientific fashion, the mother taking them on her back and swimming a few yards with them, whereupon she dives and so fairly launches them, to sink or swim by their own efforts. Dabchicks take their little ones under their wings and hold them there while they dive. The chicks are excellent swimmers, but are disposed to board their parent on every opportunity; if they become too troublesome they are chastised with a sharp peck.

A Dabchick's nest is a sodden mass of weeds, so the very young chicks are brooded and kept warm on their mother's back, under the wing, until they are old enough to sleep on the water like their parents. This is of course the exact opposite of the ordinary way, the vast majority of nestlings being kept warm and dry in the nest by the old bird brooding *over* them. Nearly all very young birds, especially those that are born naked, have to be protected from rain lest they should die of cold. When a heavy shower comes on while the mother is away collecting food, she hurries home and sits upon the nest with half-spread wings, thus forming a shelter from which the raindrops trickle away.

Young chickens begin to pay attention to their toilet almost as soon as they can stand, and I have many times watched

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them in an incubator a few hours after being hatched arranging and combing the down on their breast and shoulders. Bathing, too, whether in water or dust, is instinctive.

It seems probable that young song-birds remember something of their parents' song from hearing it during their early days in the nest. We know that song is not altogether instinctive, as call-notes are, but is to some extent learnt by imitation, because a young bird which is hatched in captivity by birds of another species learns the song of its foster-parents; thus a Skylark hatched by Linnets learns the Linnet song. But if the little bird spends the first few days of its life in the nest of its real parents it never quite forgets the notes of its own kind.

There is reason to believe, too, that young birds keep a dim remembrance of the architecture of the nest in which they were hatched, and that this early memory helps them, when instinct leads them later on to set up house on their own account, to build nests like those of the rest of their kind. But some nests are very complicated, and it is impossible to tell how they are constructed merely by looking at the outside, so there is little doubt that imitation of other birds plays its part here also, and both early memories and imitation are probably assisted by an instinctive tendency to build in a certain fashion. Young Moorhens are remarkable, as we shall see later, for practising nest building while they are still chicks.

Nests are of almost infinite variety and of all degrees of elaborateness or simplicity; indeed, the only character which they invariably possess is more or less roundness in shape. As many different kinds were described in *The Romance of Animal Arts and Crafts*, and there are so many other interesting things to be told about birds and their ways, we will not say more here on a subject which might easily fill the whole volume. Many birds build no nest at all, but lay their eggs in holes or on the bare ground. Eggs which are laid in holes are

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usually white, or have very few markings, because being hidden from sight it does not matter how conspicuous they are, while eggs laid on the ground without any concealment are covered with spots or patches or stripes which render them very difficult to see from a little distance; the latter, in short, are protectively coloured, like the precocious chicks which we mentioned earlier in this chapter.

The birds which are most extraordinary in their nesting habits are undoubtedly the Cuckoo and a few others of similar proclivities. The Cuckoo, as is well known, places each of its eggs in the nest of some bird of another species—the Pied Wagtail, for example, or the Titlark or Hedge-Sparrow—and leaves it to the care of the rightful owner of the nest. The egg is first deposited on the ground, from which the Cuckoo afterwards takes it up in her bill and, seizing an opportunity when the Wagtail or other bird is not at home, cautiously places it amongst the eggs already contained in the nest. In course of time the young Cuckoo is hatched, and then a dreadful tragedy is enacted, for this bird enters upon a career of misdoing in its earliest infancy. It is an ugly youngster, without a vestige of a feather, its eyes are not yet opened, and its thin neck is apparently too weak to support its unprepossessing head; but in spite of its blind and naked condition it is able by a wonderful instinct, aided in all probability by an extraordinarily developed sense of touch, to carry out the murderous eviction of all its foster brothers and sisters or of any eggs that remain unhatched.

The earliest account which we have of the exact way in which the deed is performed is that of the great Jenner, known to fame as the discoverer of vaccination, whose observations have many times been corroborated in the most minute detail. The young Cuckoo struggles about in the nest until it gets its broad, shovel-shaped back under an egg or one of its fellow tenants; it then climbs backwards up the side of the nest and, standing with its legs straddled well apart,

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heaves its burden on to the edge, completing the business by elbowing it fairly over the margin with its featherless wings. Having made sure by feeling about that it has really gone overboard, the blind little monster sinks to the bottom of the nest and rests until sufficiently recovered to hoist another victim on its shoulders and thrust it out in the same manner. In this merciless fashion all are sacrificed, and the usurper remains in sole possession of the nursery.

Not the least strange part of the story is that the birds whose young he has murdered make a spoilt child of him. He becomes the sole object of their solicitous care and thrives under their devotion. Even when fully fledged and considerably larger than his hard-worked foster-parents, the overgrown youngster continues for some time to receive stolidly every insect that they can bring him. To see him receiving their dainty offerings is a ludicrous spectacle, for often they have difficulty in reaching his bill, and are obliged to perch between his shoulders in order to put the food into his cavernous, orange-yellow mouth.

From the examples we have given it will be clear that a newly hatched nestling is possessed of a wonderfully complex automatic machinery which enables it, when exposed to certain conditions, to perform instinctive acts with a great amount of skill. But we have also seen that young birds learn by experience and imitation, and that they are even taught many things by their parents. In this way instinct becomes to a great extent replaced by intelligence; and the more intelligent the bird, the longer the education through which it passes in its early days before it is able to look after itself and make its own way in the world.

CHAPTER II

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Incubation period—Division of labour—Domesticated husbands—Swifts—
A rebellious hen—The cloistered Hornbill—Manner of leaving and
returning to the nest—Protective colouration—Scene in a heronry—
Pelican Island—Incubation under difficulties—Cold and heat.

AFTER an egg has been laid, as everybody knows, it must be kept warm for a certain length of time, amounting in most cases to two or three weeks, before the chick is hatched. No less familiar is the method by which this is effected, and there are few phases of bird-life which are easier to observe. Anybody may, if they care to do so, see a Hen upon the nest, brooding over her eggs with feathers puffed out and wings slightly drooped, covering them patiently hour after hour with her warm body, leaving them only for a brief interval from time to time in order to feed, and, after making a hurried meal, returning anxiously to her treasures to renew her long vigil, until at last, on some wonderful day, her patience is rewarded and she emerges from her obscurity in all the pride of motherhood, surrounded by a brood of tiny chicks. We all know this, so why have a chapter about brooding? Is there anything more to be said on such a very commonplace subject? Yes, there is a great deal to be told—far more than we have space for here—and I think we shall find that, like most pages from the life-history of a bird, the more we know of it, the more interesting it becomes.

The period of incubation, as it is called—the period that elapses between the moment when the bird begins to ‘sit’ and the hatching of the egg—varies greatly with different kinds of

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birds. The domestic Fowl usually takes just three weeks, but its near relative, the Pheasant, takes several days longer. Most of our little songsters hatch their young in about a fortnight, and some small birds only require ten days; but a Swan must brood upon her eggs five weary weeks or longer, and the great Condor has to wait almost two months before her hungry offspring emerges from the shell. It is usually supposed that weather and climate have something to do with the length of time required for the hatching of the eggs—that the same sort of eggs will hatch sooner in warm weather than in cold, in a hot climate than in a cool one; but about this we really know very little, though it seems probable that these things may make some little difference.

We are accustomed to speak of the brooding bird as “she,” and we are seldom wrong in doing so, for in almost all cases the female takes the principal if not the only part in the duties of incubation. If we turn to the most primitive and least intelligent of the birds, however, we find just the opposite state of affairs; with them it is the male who takes upon himself these duties, while his spouse enjoys a life of freedom. A little higher in the scale, amongst birds of rather more intelligence, cock and hen share the brooding between them, but we already find the female performing the greater part of the work and her partner acting only as assistant. When we come to the most highly developed and most intelligent of birds, the wife undertakes the brooding, while the husband feeds and tends her and occasionally relieves her for a little while; he watches over her, warns her of danger, protects her, entertains her, sings to her, and generally behaves to her like a good husband. A charming and, so far as we are aware, quite unique characteristic of the domestic life of the Hawk-Owl (*Surnia ulula*) has been noticed by Mr. Seebohm, who states that sometimes both the parent birds are found sitting upon the nest in company.

It is interesting to find that in all cases in which the hen is larger and more brightly coloured than her mate, she consist-

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ently shirks her duties, and he takes her place in sitting upon the eggs. There are not many such birds, and of these but a single species nests in Great Britain—the Red-necked Phalarope (*Phalaropus hyperboreus*). The Phalaropes are amongst the most graceful of birds, and are allied to the Plovers, but, unlike those birds, they are equally at home on land or water. Their nest is placed on the ground, among heather or herbage, and when the male bird is brooding over the four pale-brown, dark-spotted eggs, he is so faithful to his charge that he will hardly leave them to escape being trodden upon. Indeed, these birds are extraordinarily tame; and it is unfortunate for them that they are so, for they fall easy victims to the collector, and the race is rapidly becoming extinct in Britain. That is a fate which has already overtaken their relatives the Dotterel and the Godwit, which now only come to us as occasional visitors. Both these birds resemble the Phalaropes in the male being smaller than the female and performing the office of brooding, in which his partner takes no share. In the seventeenth and eighteenth centuries the Godwit was a famous table delicacy and was netted in great numbers; at the same time it was being robbed of its resorts in the fens by drainage, so that it is now lost to us. The Dotterel, one of the most beautiful of the Plover kind, has shared the same fate; and we have thus, through their trustfulness and our own folly, deprived ourselves of three of the most charming of birds. The word Dotterel means ‘Little Dolt’; whether the bird owes its name to the ease with which it is caught, or to the eccentric behaviour of the male in sitting on the eggs while his wife wanders abroad, or to both, we cannot say.

Some birds, amongst which are the Owls, occasionally begin to brood as soon as the first egg is laid. Owls are not quite so wise as they look, but in their domestic arrangements they would certainly appear to display much wisdom if there were any reason to suppose that they could foresee the result of their action. It is clear that the eggs which are first laid and

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brooded over will hatch before those which are laid several days later, and this is an advantage to the parents in two ways. In the first place, it makes it easier for the old birds to provide for their young ; and, further, the warmth of the earlier chicks helps to incubate the eggs which are still unhatched while the father and mother are both away hunting for food. But the plan would not do at all in the case of birds which can run about almost as soon as they are hatched, because the parent bird would not be able to brood over the eggs and to take charge of her precocious children, both at the same time. We find, therefore, that birds such as Pheasants and Plovers never begin to sit until all the eggs have been laid.

We have already mentioned that the cock often keeps the hen company and sings to her when she is on the nest. He may sit on a neighbouring twig while he pours forth his song ; he may soar aloft like the Lark ; or, like the Swift, he may call out a cheery greeting as he skims past her in rapid flight. This habit of the Swifts was, I believe, first noticed by Gilbert White. The Swift is especially lively in sultry, thundery weather. "In hot mornings several, getting together in little parties, dash round the steeples and churches, squeaking as they go in a very clamorous manner ; these, by nice observers, are supposed to be males, serenading their sitting hens ; and not without reason, since they seldom squeal till they come close to the walls or eaves, and since those within utter at the same time a little inward note of complacency."

In the evening, however, after the hen has been sitting all the day in her dark nest, she darts out in the fading twilight and "stretches and relieves her weary limbs, and snatches a scanty meal for a few minutes, and then returns to her duty of incubation." But she does not always return very willingly ; sometimes the joy of that mad flight is too fascinating for her, and she cannot make up her mind to return to the narrow hole under the eaves. And so her flight is prolonged, until her husband has to interfere. He dashes after her to remind her

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that she really must be going home—that she has already been out too long, and that the eggs are growing cold; and will she please come back this very minute?

(Mr. Hudson¹ describes how he watched the Swifts at Seafood going through this interesting performance. He says: "It was curious and amusing to see a pair in some cases, the hen-bird wildly rushing away, the mate in mad pursuit, and then when with infinite pains she had been driven home suddenly dashing off again, and the wild chase about the sky beginning afresh. Once I saw the hen-bird break away four times after being brought to the breeding-hole; but after the fourth time she remained in the nest, and the good, zealous husband went away to enjoy himself. A swift chasing his wife home in the evening can easily be distinguished from one swift chasing another swift for fun, or whatever the motive is that keeps them in a perpetual hunt after one another. He follows her closely in all her mad flights and sudden doublings until he has got her face towards home, and then keeping close to her agitates his wings in a peculiar manner, at intervals gliding smoothly, uttering all the time a measured sharp clicking chirp—a sound as of repeated strokes on a piece of metal."

The Hornbills (*Bucerotidæ*), birds with an immensely developed bill surmounted by a curious outgrowth called the *casque*, are given no opportunity of playing truant when they should be keeping their eggs warm, for the hen-bird is carefully imprisoned by her mate in the hollow tree where the eggs are deposited, and must remain there until the young are almost fully fledged. The incarceration is effected by building up a strong barrier at the entrance, leaving only a narrow slit through which the hen-bird can protrude her bill to receive the food brought to her by her husband. This may appear a very tyrannous proceeding, but there is no reason to believe that the imprisonment is not quite voluntary, for the female often her-

¹ *Nature in Downland*, p. 201.

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self assists in building the wall, which serves to protect her against the attacks of monkeys and large lizards. The male bird is very attentive, and the way in which he feeds his wife is one of the most remarkable features in the life of these strange birds.

Their diet is strictly vegetarian, consisting of various kinds of grape- and berry-like fruits. These are collected by the husband and brought home to his wife, and so far there is nothing extraordinary in the proceeding, for many birds practise this courtesy. What is so remarkable in the case of the Hornbill is that the fruit is offered in a neat little purse-like bag! The bag is about the size of a fig, which it resembles also in shape, and is made of some elastic material, so that it is neatly filled by the little collection of fruit which it contains. When first these curious bags of fruit were discovered they were a great puzzle to naturalists, but it was soon found that the bag is composed of the lining of the bird's gizzard, which becomes loosened and is cast off in one piece. We cannot wonder, therefore, that after feeding his partner for several weeks the devoted male is worn to a shadow by his self-sacrifice!

It is interesting to observe the various ways in which different species of birds leave and return to the nest. The departure is usually effected without ceremony, the bird flying directly from the side of the nest very quietly so as not to betray its whereabouts, but, as most boys are aware, some species, such as Blackbirds, are very clamorous and make a great fuss if they are surprised and frightened off the eggs while sitting. That, however, is not their usual method of leaving home; but there is clearly nothing to be gained by silence when the bird knows that its nest is already discovered. The Swallow-tailed Kite (*Elanoides furcatus*) has a peculiar way of rising straight up from the nest for a little distance, as if it were projected by a spring. No other bird behaves in quite the same manner, and its method of alighting is equally peculiar, for it hangs in the air a few feet above the nest with its outspread wings

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apparently motionless, and then lowers itself upon the eggs so gradually that it is difficult to say just when it alights.

Kites and other similar birds which build high in trees, or other inaccessible places, and are strong enough to defend their homes against winged marauders, need not attempt to conceal their goings and comings, but it is different with the ground-builders, whose safety depends entirely on their success in escaping observation. Many of these birds make hardly any nest—some, indeed, have none at all—and the colour of their eggs is in such perfect harmony with that of their surroundings that it is very difficult to detect them unless you know the exact spot in which to look for them. Frequently the birds themselves are also protectively coloured, so that it is only when they are moving that they are at all likely to be discovered. Such birds as these have quite a different method of going and coming. In the first place, they seldom fly directly from the nest, but run a little distance before rising from the ground. I believe the Skylark, to take a familiar example, always does this, and I have never seen one alight directly upon its nest.

Some of the larger ground-nesting birds are extremely cautious in their movements, but their methods differ even in the same species. A remarkable instance of this is afforded by the Stone-Curlew (*Ædicnemus scolopax*), one of our summer visitors which is met with chiefly in Norfolk and on that account is often spoken of as the Norfolk Plover. It is one of the largest of the Plovers, and resorts to barren, stony ground with scanty vegetation, where it lays its two eggs on a level spot, without the slightest attempt at a nest. The eggs so closely resemble in colour the sandy, flint-strewn surface that only a practised eye can detect them, and the drab, mottled plumage of the bird enables it to escape notice except at quite close quarters. Even then, as it squats with its neck outstretched close to the ground, it would usually pass unobserved if it would but keep its large, bright, golden eyes closed. Now

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this bird has two distinct methods of approaching its eggs. One way is to move very deliberately and stealthily, making long, slow strides, with its head held low. From time to time it pauses or remains perfectly still for several minutes, and proceeding thus it has frequently been seen by patient observers to take ten minutes or longer in arriving at the nest from a point only a few feet away.

The other method, which is only adopted, I believe, after the birds have begun to sit, is well described by Mr. Trevor-Battye in his *Pictures in Prose*. He says: "The pair of which I speak had chosen the middle of a gravelly space among the pines. By creeping up on hands and knees under cover of a bank one could gain a position, just fifteen paces away from the nest, without being observed: so close that with my glass I could see the light shine through the crystal prominence of the sitting bird's great yellow eyes. At intervals one bird would relieve the other on the nest. When disturbed the birds always ran for shelter to a bank beneath the pines. And here the bird that was not sitting always stood as sentry. When its turn came to relieve its mate it would walk pretty deliberately across the first part of the open, where it was more or less screened by a fringe of trees; and there, having reached a point that was commanded from a long way off, it would suddenly lower its head, and run as fast as a red-leg to the nest. When it was about a yard away the sitting bird would slip off and, staying for no greetings, run past and away to the pine-bank." Mr. Trevor-Battye noticed that the bird always rose from the nest *backwards*, and so avoided disturbing the eggs with its long legs. He also observed that "the new-comer did not turn the eggs immediately, but squatted perfectly still for perhaps a minute, as if to make sure it was not disturbed. And after the eggs were satisfactorily bestowed, and all the coast seemed clear, the bird would close its eyes in the hot sunshine and appear to go to sleep. But even then I could scarce move so much as a finger above the grasses, but instantly it was off its nest and away."

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This delightful picture of the domestic life of the Stone-Curlew introduces us to another interesting question of bird-life: the way in which a bird relieves its partner upon the nest.

[Let us first take an instance of a home-coming from amongst the birds of our own land. When I was a boy I used occasionally to make a breathless excursion to a small heronry which was situated in the midst of carefully preserved lands in a mid-land county. Even now I have a vivid recollection of more than one such visit, for the way lay through hostile country where schoolboys did not meet with a very cordial reception, and the keeper, a thick-set man with keen grey eyes and a stone-wall expression—or perhaps *brick-wall* would give a more correct impression of his sunburnt complexion—was a danger to be reckoned with before venturing within the bounds; seen face to face at close quarters (it happened once), there was a positively painful suggestion of massive strength about him, and an even more discomfiting suggestion in the short ash-plant (I never saw him carry a gun) which seemed to be a part of his awe-inspiring presence. I mention the keeper because he had a hut or shelter close by the heronry, and it was owing to this circumstance that I spent more time watching the birds than might otherwise have been the case.

[Late one afternoon I had cautiously approached the heronry along a hedge and through a tangle of undergrowth when this much-dreaded person suddenly appeared outside his hut, and there was nothing for it but to lie hidden and await an opportunity to escape. Herons have learnt from sad experience to be the shyest of birds where man is concerned, but the members of this little colony must have decided that the keeper was their good friend. Now I think of it, I believe it was because, as I have already mentioned, he never carried a gun—nor did I ever hear a gun fired in the neighbourhood. At all events, the birds did not appear to be disturbed by his presence, and were certainly not nearly so much alarmed as the small boy crouching amongst the bushes.

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On that afternoon, watching alternately the leisurely movements of the keeper and the bird life around, I got to know more about the domestic life of Herons than I ever had an opportunity of learning for myself before or after, and amongst other things I was fortunate enough to see one of the birds return to the nest, where his partner had been patiently sitting, and take his place upon the eggs. All that had been visible of the sitting bird was her sharp bill, and occasionally her head and a portion of her long neck, outlined against the sky over the margin of the big nest of sticks near the summit of a tall elm tree, and it was a sharp movement of this tantalising object which first directed my attention to the returning bird. Looking towards the sky, I saw him sailing in the direction of the heronry in a grand downward sweep, his legs trailing out behind, his wings outspread and raised high above his back, and his neck bent in a sharp curve so that his head was drawn far back close to the body. As he drew near, his partner uttered a sudden harsh cry of greeting, which he answered by a wild scream as he stretched out his neck and came rushing down.

Just before he reached home his great hollow wings were brought smartly downwards to check his fall as he alighted and balanced himself on the edge of the nest; at the same moment, his mate stood up and they joined in a regular duet of screaming. Whether she was scolding him for being so late and he was explaining that it had taken him so long to get his dinner that he really couldn't help it, or whether they were just telling one another how glad they were to meet again, it was impossible to say. In any case, they soon became silent, and then the bird which had just arrived lowered his head and seemed to be carefully examining the eggs before bending his long legs and sinking down into the hollow of the nest. As he disappeared from sight his partner shook out her plumage and flew off, with slowly beating wings, towards the feeding-grounds, and again the voices of the small birds in the bushes below, unobserved while this interesting scene was being enacted, were



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BROWN PELICANS AT HOME

Pelican Island, off the east coast of Florida, has been handed over to these birds by the American Government, by whom they are strictly protected. So many pelicans have set up house on the island that all the mangrove trees have been killed.



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the only sounds that broke the silence of the heronry. All this took place, as I have good cause to remember, late in the afternoon; the other change—for these birds only work two shifts during the whole of the day and night—occurs in the early morning soon after the sun is up.

On the east coast of Florida there is a muddy islet, not more than three or four acres in extent, which is known as Pelican Island because a colony of Brown Pelicans (*Pelecanus fuscus*) have annexed it for their very own. They are practically the only inhabitants, and their claim is backed up by the Government of the United States, who will not allow any one to interfere with the birds. Nobody is at all likely to want to take possession of their diminutive country, because it is little more than a mud-bank and only one little corner of that is really safe, for when the 'northers' come the waters sweep over the remainder of the islet and destroy scores of nests. The Pelicans, however, are a patriotic race and devoted to the land of their birth; no doubt they regard it as a very fine country indeed, for they return to it year after year for the purpose of bringing up their families. When they first landed the tiny islet was well grown with mangroves, which are equally fond of mud-banks; but so many Pelicans went to live there and built their nests upon them, that tree after tree was killed, and at the present time there is scarcely one remaining which does not present the desolate appearance which is shown so well in our photograph.

The birds arrive early in November, and within a month they have all set up house and are busy laying their two white, chalky-looking eggs. The husband and wife share the sitting between them, and when the time comes for changing over—which occurs at all hours of the day and with no sort of regularity—they go through quite an elaborate ceremony. Let us suppose that the male is coming home from his fishing. He alights near the nest where his partner is sitting, and with his great bill pointing straight up in the air he slowly advances,

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waving his head from side to side. His wife, on the contrary, sticks the point of her bill down into the nest, twitches her half-opened wings, and greets him with a husky, gasping "*chuck!*"—the only sound a grown-up Pelican can utter. Having saluted one another in this curious manner there is a pause in the proceedings, which is occupied by both birds preening and arranging their feathers. The male then steps on to the nest and settles down, while his spouse goes to bathe and attend to her toilet before setting out to catch fish for her dinner or to circle high into the air in one of the wonderful soaring flights for which these great birds are so famous.

A few birds, such as the Raven, display great hardihood in their endurance of cold when sitting. One of the most remarkable of these is the Great Horned Owl. In the northern States this is the first of all the birds to nest, and in spite of ice and snow it starts housekeeping about the end of January. On some tall forest tree, very often on the side of a hill, exposed to the full force of storms and blizzards, the hardy mother sits upon the rude platform of sticks which does duty for a nest, while the temperature is still far below zero. It sometimes happens that the eggs are frozen by the intense cold; in that case the bird merely buries them in the loose rubbish of the nest and, undiscouraged by the disaster, lays another set. The same nest may be used year after year, until at last it becomes so rotten that, incapable of supporting another family, it falls to pieces before the young are reared, and the little ones have to be brooded upon the bare bough.

Equally hardy, on occasion, is the Black Gyrfalcon (*Falco rusticolus obsoletus*). Mr. Turner, of the United States Signal Service, found that a pair of these birds had made their home at Fort Chimo on the ledge of a great rock which forms a precipice three hundred feet high. The nest was shut in by a regular palisade of ice columns, and could only be approached by a narrow space or doorway next the main rock; yet for nearly a fortnight the birds had been successfully incubating

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their four eggs in this ice chamber, better suited, one would have thought, for cold storage than for hatching!

Even this, however, is by no means the most extraordinary case of incubation under difficulties. In choice of time and place for nesting—if nesting it can be called—the eccentricity of the great Emperor Penguin of the Antarctic is unrivalled. Laying its single large egg amidst the darkness of a polar winter—when the thermometer sometimes shows a temperature of 100° Fahrenheit below freezing point, and the average for a month is but 50° higher than that—this strange bird spends the seven coldest weeks of the whole year in brooding over it; and the ground whereon it chooses to keep vigil in these cheerless circumstances is nothing in the world but sea-ice! To bring about a successful result and hatch a chick amidst such conditions very special and peculiar methods are necessary; but the difficulty, we need hardly say, has been solved in the evolution of these remarkable birds, otherwise they could never have acquired their extraordinary habit.

Given a bird, an egg, a field of ice, a temperature 50° below freezing point, and never a gleam of sunlight, the problem is to keep the egg warm enough for a chick to be produced from it. Could anything be more discouraging, or so apparently hopeless? You would suppose that the first essential would be that the bird should make a particularly warm nest in which to incubate. But without materials nest-building is obviously impossible, and as a matter of fact the Emperor Penguin dispenses altogether with such a luxury. The plan it adopts is to stand upright and keep the egg off the ice by placing it on the top of its large webbed feet, where it is held in position and covered by a heavily feathered fold of skin from the under side of the body, which hangs over it like a curtain and completely hides it. By this close contact with the body a sufficiently high temperature is maintained to bring about the development of a chick, which emerges at the end of the seventh week as queer-looking an object as one could well imagine, a pair of wide goggle-

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like rings round its eyes and a thick coat of down giving it a general appearance of being dressed for a motor journey.

Great heat is perhaps more often fatal to the nesting of birds than excessive cold. On the plains of India, if a Sand-Grouse be frightened from its eggs for any length of time they begin to cook under the fierce sun, and doubtless the same accident befalls other birds. But if Nature can devise means whereby an egg can be hatched in the terrible cold of an Antarctic winter, so too can she teach birds how to ward off the danger to incubation arising from tropical heat. Thus according to the Indians, Dr. Wallace tells us, the Gulls and Terns on the Amazon carry water in their beaks, during the heat of the day, to moisten their eggs (which are deposited in little hollows on the sand-banks) and keep them cool; and other birds are said to act on similar principles. This, however, introduces us to a subject which we must consider in the next chapter—the subject of incubation without body-heat.

CHAPTER III

BIRDS' INCUBATORS

Extremes of the brooding instinct—Aids to incubation—Sun-warmth : its advantages and dangers—Ostrich, Sand-Grouse, and Black-backed Courser—The Mound-Builders and their incubators—Maleos—Choice of ground—Hot springs—The buried chick—Brush-Turkey—Heat from fermenting vegetable matter—Attending to the incubator—Large feet of Mound-birds—Megapodes—Immense size of mounds—Ocellated Megapode—Precocity of Mound-bird chicks—Volcanic heat.

WE do not always sufficiently realise how very great is the variety of character exhibited by different kinds of birds and even by different individuals of the same species. I do not refer now to the more conspicuous aspects of their nature—the fierceness of the nobler Birds-of-Prey, the quarrelsome nature of that familiar rowdy, the Sparrow, the sociability of so many other Finches or of Parrots, and so forth—these are things which force themselves upon the attention of the least observant person. I am thinking rather of the domestic side of their lives, and more especially of their way of carrying out parental duties. As we have already been considering the question of incubation in the last chapter, it will be interesting and convenient now to give a few instances of the remarkable extremes of this instinct, and to show how some birds seem to be overcome by an irresistible longing to devote themselves to the tedious duty of brooding over a nest, while others manage to become parents without spending a single hour of their lives thus occupied.

In many birds the desire to 'sit' appears at some time or other to be quite overwhelming. I need hardly remind you of

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the obstinate way in which a broody Hen will insist upon settling down not only upon a nest of eggs, but upon anything which bears the slightest resemblance to an egg; she will be perfectly satisfied with a smooth stone in a quiet corner, if she can find nothing better. Once, in a disused barn, I came upon a Hen brooding over two potatoes, and from their appearance I have no doubt she had been sitting on them for several days—as happy, probably, as a child with a rag doll. And see how disconsolate our Hen is if we will not leave her in peace; how dejected she looks as she wanders about the farmyard, until at last she “goes off being broody,” as the country people say.

A similar longing appears to take possession of the males of certain species during the breeding season. It is often seen in domestic Pigeons, and, as Mr. Dixon remarks, “the older a cock-pigeon grows, the more fatherly does he become. So great is his fondness for having a rising family, that an experienced unmated cock-bird, if he can but induce some flighty young hen to lay him a couple of eggs as a great favour, will almost entirely take the charge of hatching and rearing them by himself.” Brehm, the famous German naturalist, somewhere describes the amusing situations which he observed in Lapland as a result of this instinct in the case of some Auks. Amongst these attractive birds the males are in the majority, consequently every year some of them are obliged, much against their will, to remain bachelors. About Easter-time the great flocks hurry back from the sea to reach the bergs where they were born—for these birds, like many others, seem always to return if possible to their birthplace, when they in their turn are intent on bringing up a family of their own. The more fortunate ones, that is to say those who have found mates, may be seen coquetting and indulging in playful caresses by the way, while the disconsolate bachelors keep them company.

On reaching the berg, they all, married and single, land, and the paired birds hasten to put their old nesting-holes in order

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or to make new ones. In due course a big, top-like egg appears in every burrow, and the happy parents take turns in brooding over it. (What becomes of the bachelors meanwhile? They too would very much like to brood if they could but find a mate, but that is out of the question. So many of them attach themselves to some happy couple as friends of the family, and keep the husband company while he stands on guard before the nest on which his wife is brooding. From time to time, the husband takes a turn on the nest while his partner goes to the sea to fish, but his bachelor friend still mounts guard; indeed most of his leisure is spent in this way. It is when both partners visit the sea together, however, that he finds his opportunity and his reward, for on these occasions he eagerly enters the burrow and takes a turn at sitting upon the forsaken egg, only resigning the position when the owners return. As a result of this unselfish conduct orphans are unknown amongst these birds, just as they are unknown amongst the Penguins, for even if both parents come to grief, the bachelor birds are always ready to finish hatching the egg and to take charge of the chick during the weeks which pass before it is capable of attempting its first flight to the sea.

Now let us look at the other side of the picture. In striking contrast to the birds which we have been considering, there are others which so arrange matters as to get their eggs hatched without their own personal care and attention during the process of incubation—or, at all events, with as little as possible. The methods which they adopt to this end are of remarkable interest, and we may well devote the remainder of the present chapter to describing them. We are not concerned now with Cuckoos, which artfully foist their eggs upon other birds and leave them to their fate—we have already had something to say about *their* conduct; but with those birds whose eggs are incubated without the help of body-warmth, in much the same way as the eggs of domestic fowls are often nowadays hatched in an artificial incubator by the heat from a lamp, except that

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the artificial incubators of the bird world are supplied with heat in a different way.

As might be supposed, it is only in very warm climates that birds' 'artificial incubation' could as a rule be carried on with any hope of success, and you will of course at once guess that one way in which it can be brought about is by the heat of the sun. Until recent years it was commonly believed that Ostrich eggs were always hatched in that way; but like many other popular ideas about the life of birds, this one is not quite true. The real facts are as follows.

The Ostrich, like its near relatives the Emus, Rheas, and Cassowaries—all, indeed, except the curious little New Zealand Kiwis, which nest in burrows—is content with very little in the way of a nest, which consists of nothing more than a slight hollow scratched in the ground. We know exactly how the Ostrich makes the nest hollow, and as it is as peculiar as everything else about this strange bird, it is worth describing.

You have no doubt noticed that when an ordinary domestic Hen wants to take a dust-bath in the warm weather, she often prepares for it by standing on the chosen spot and scratching up the dry earth with her claws until she has made a convenient little hollow in which she can crouch and flutter her feathers. Most birds which have occasion to scratch holes in the ground, whether for the purpose of dusting, searching for food, or providing a receptacle for their eggs, go to work in the same manner. Not so the Ostrich; he uses his immensely strong legs in quite a different way. Having decided where the nest is to be, with one of his wives (he usually has at least three or four) in attendance, he sinks down on his breast, and in that position proceeds to tear up the sand with powerful kicks, casting it behind him as he does so. When one part of the hole is deep enough, he turns round and continues the operation in another direction until he has made a circular hollow, about a yard wide. Meanwhile his wife stands by and looks on; now and then she makes some show of helping him

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by picking up a little sand in her beak and dropping it about the edges of the hole, but her part is mainly that of an interested spectator. The work is soon completed, and the result is a shallow pit, around which the loosened earth is heaped in a low bank. Against this bank, in due course, the outermost circle of eggs will rest. The hens now begin to lay, all in the same nest, each of them depositing an egg every other day, until there are from fifteen to thirty altogether. There may be as many more scattered around the nest, and these, as we shall see in another chapter, have their own peculiar use.

Until ten or a dozen eggs have been laid the nest is left unattended, both day and night, with no protection except a thin covering of sand against the deadly wild-beast foes which prowl about the desert tracts. When that stage is reached, however, the male bird begins to brood over the eggs, taking his place upon them at nightfall, surrounded by his wives. But the process of hatching is principally dependent upon the burning sunshine and the hot desert sand, for during the day the eggs are left in the pit unattended, covered as before by a thin layer of sand, while the birds go hunting for food or make long journeys in quest of water.

In the cooler portions of the country which the Ostriches inhabit, and on the South African farms, the heat of the sun is apparently not sufficient to enable them thus to play truant, for in these localities the hens brood by day. But from the boundaries of Barbary, throughout the tropical region towards the South, where the birds are in attendance, whether by day or by night, it would seem to be for the purpose of guarding their treasure from jackals and other small beasts of prey rather than from any real necessity for helping to keep the eggs warm.

Many birds besides Ostriches and their near relatives are relieved to some extent from the duties of incubation owing to the warmth of the sun in the countries which they inhabit: amongst them are the Sand-Grouse and other species that

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make their home on deserts and sands. In some places, however, where the heat is very great indeed—in the hotter parts of India, for instance—we find the exact opposite to be the case; the birds are obliged to remain on the nest all day, exposed to the terrible heat, not because the eggs would grow cold if left to themselves, but because they would soon be cooked if they remained uncovered! According to Captain Verner, the Black-backed Courser (*Cursorius ægyptius*), which buries its eggs in the sand on the banks of the Nile, has found a more ingenious way out of the difficulty. The bird dips its breast in the river until the feathers are thoroughly soaked with water, and then presses it against the sand under which its eggs are concealed. In this manner the ground is kept moist, and the evaporation of the water prevents the sand, and therefore the eggs, from becoming overheated, just as those porous earthen jars which are used in Spain and other countries about the Mediterranean and elsewhere keep the water which is contained in them cool and fresh by evaporation of the moisture which percolates to the outer surface of the vessel.

All the birds which we have hitherto mentioned are mere amateurs in the making of artificial incubators compared with the order of which we have now to speak, that, namely, which consists of the various birds known as Mound-Builders.

Of these there are several kinds, and all of them are humble relatives of our Common Fowl, living in Australia and various islands from New Guinea to the Philippines. More than three hundred years ago travellers brought home wonderful stories of the strange habits of these birds, but naturalists were slow to believe them, regarding their accounts as mere 'travellers' tales' and nothing more. We know now that these old stories were fairly accurate as far as they went, and that they did not recount half the curious works which are wrought by the Mound-Builders.

The fact is, the birds of this strange order have discovered the art of making efficient artificial incubators which relieve

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them entirely of the duty of brooding over their eggs. Some of them, it is true, merely bury their eggs in the ground, but even these are often remarkable for the skill with which they choose the sort of ground which will best suit their purpose; others, however, prepare elaborate structures which are begun many weeks before the eggs are laid.

An example of the first kind is the Maleo (*Megacephalon maleo*), first fully described by Dr. Wallace in his book about the Malay Archipelago. This bird inhabits the island of Celebes, and is the only Mound-Builder which is at all remarkable for its colour. Most of them are dull, plain-looking birds, but the Maleo has not only a glossy black and rosy-white body, but its bare neck is bright red, and on the back of its head it bears a peculiar ornamental knob, like a small helmet. The nesting-place described by Dr. Wallace was a large uninhabited bay between two islands, where a forest extends to the edge of a steep beach composed of loose black sand. All the rest of the beach is white, and the reason why this portion is black is that ages ago a great stream of lava from a neighbouring volcano here flowed down a valley to the sea, and it is by the breaking up of the lava that the black gravel has been formed.

To this unattractive spot numbers of Maleos repair year by year to deposit their eggs, in August or September, when there is seldom any rain. They fly down to the beach from the interior of the island in pairs, often travelling ten or fifteen miles; and when they arrive at the nesting-ground both birds begin to scratch a hole in the hot, black sand, just above high-water mark. The Maleo's toes are joined together by a strong web, forming a broad, powerful foot, and when the birds are engaged in digging the sand flies up in a perfect shower. In this way a hole three or four feet in depth is soon excavated, and at the bottom a single large egg is laid. After covering it over with about a foot of sand the birds return to the forest. In rather less than a fortnight they again go down to the beach in company and once more set to work at the same spot.

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Another egg is then laid, very near to the first. The hole is partly filled in every time an egg is deposited, so the birds have to renew their labour at each visit. It often happens that many birds lay in the same hole, a dozen eggs, or even more, being frequently found together. The natives regard the eggs as a great delicacy, and visit the beach every year from a distance of fifty miles around on purpose to obtain them. They are richer than Hens' eggs, and as one of them is large enough to fill a fair-sized tea-cup it is sufficient, with a little rice or bread, for a very good meal.

Why, it may be asked, do the Maleo-birds choose the unattractive-looking black ashes in preference to the clean, white sand which covers the rest of the beach of Wallace Bay? The latter would seem to be far more suitable, for the ashes are rough and coarse, consisting of fragments of lava each of which is about the size of a bean. Perhaps there is some special advantage in the dark colour. Let us consider this. You know that if you wear a black jacket in very hot, sunny weather you feel much hotter than you do if you wear a white one; that is because black absorbs heat, while white reflects it; and here we seem to have the true reason why the birds choose the black gravel instead of the white sand, not only in Wallace Bay, but at other places on these shores where the same conditions exist. Everywhere, so far as we know, they show the same preference.

(This is a wonderful instinct; but the Maleo-birds of the Bone Valley are even more sagacious. Here two cousins named Sarazin, both of them naturalists, came upon a great number of pits dug out quite close together in a bamboo thicket, and on a search being made several new-laid eggs were discovered. Now this valley is about seven hundred and fifty feet above the level of the sea, and the temperature is rather low, especially in the forest, so it seemed surprising that Maleo eggs left buried in the ground should ever produce chicks. Further on and at a still greater height—this time about one thousand five hundred

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feet above the sea—more diggings were found. What was the explanation? It was this: in the neighbourhood of the pits in each case there was a warm spring, the water of one of them being so hot that it caused the skin to smart and tingle when a hand was plunged in it, and these springs provided the necessary heat for the birds' incubators. Wherever Maleo-birds were found in the interior of the Celebes, warm springs were sure to be discovered not far away.

When the eggs have been buried the mother pays no further attention to them, but leaves them to hatch in the hot sand. Fortunately they require no attention, for even if they did it is difficult to see how the parents could remain to watch over them. Hundreds of birds visit this place to lay their eggs, and as their food consists entirely of fallen fruits, in search of which they are obliged to wander far afield, and the eggs are laid at such long intervals (about eight eggs are laid during the season, and it takes the bird three months altogether to produce them), the supply of food would be insufficient, and the birds would all very soon die of hunger if they remained in the neighbourhood of the beach. Besides this, owing to the continuous diggings the surface of the sand becomes not unlike that of a rough, confused sea, and is constantly changing in appearance, so that it is doubtful whether a bird would be able, after a short time, to discover the spot where she laid her first egg. And even supposing all the birds which bury their eggs in one hole were to stay beside it, they could not possibly know their own chicks when they made their way out of the ground.

(One of the most remarkable circumstances about these birds, and others with similar habits, is that the chicks should ever escape from the mound at all. Any ordinary chick—a young Turkey, for example—would be quite helpless if it found itself buried alive when it escaped from the shell; but not so the young Maleo. We have already mentioned that the eggs are very large, and we find that the chicks produced from them are fine, vigorous youngsters from the moment they are born.

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Somehow or other they work their way up through the sand and run off at once to the shelter of the forest. The young Mound-Builder, whatever the species, is one of the most precocious of bird children.

The actual manner in which the chick makes its way to the surface has been observed in the case of the Brush-Turkey (*Talegallus lathami*), another of the Mound-birds. Mr. Barnard, of Coomoooolaroo, a Queensland squatter and the head of a family of naturalists, buried an egg and allowed it to incubate in a heap of manure. A few days later he went to inspect it, and on carefully removing the covering he found a little bird within a few inches of the surface, lying on its back and trying to work its way out by means of its feet. His sons also on several occasions discovered young Brush-Turkeys in the same posture, when they were digging for eggs. This species is one of the largest of the Mound-Builders, being nearly the size of an ordinary Turkey-hen. Its plumage is sooty-brown in colour, but the skin of the neck is pinkish-red and the bird possesses a large, bright yellow wattle just above the breast. The incubators made by the Brush-Turkeys are on quite a different principle from those of the Maleos.

Instead of merely digging holes and burying their eggs where they will be hatched by the heat of the sun, the Brush-Turkeys construct huge mounds of leaves and grass mixed with earth, and the warmth produced by the vegetable matter as it ferments and decays enables the eggs to develop. If you will make a hole in a heap of grass which has been piled up in warm weather while still wet—cuttings from a lawn-mower, for instance—and left to rot, you will be able to observe for yourself how much heat is produced by the process of decay. This species of Brush-Turkey spends several weeks in collecting the material for its mound, and by the time the eggs are laid it has built a pyramid which is often large enough to make many cart-loads. Of course one bird cannot do all this; at least a pair of them join forces to make one of the smaller heaps, and the

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larger mounds may be the result of the united labours of several pairs. Besides this, the birds return to the same spot season after season, and add fresh material every year, so the heap goes on increasing in size.

(Gould, that famous old writer about Australian birds, says: "The materials composing these mounds are accumulated by the bird grasping a quantity in its foot and throwing it backwards to one common centre, the surface of the ground for a considerable distance being so completely scratched over that scarcely a leaf or a blade of grass is left. The mound being completed, and time allowed for a sufficient amount of heat to be engendered, the eggs are deposited in a circle at the distance of nine or twelve inches from each other, and buried more than an arm's depth, with the large end upwards; they are covered up as they are laid, and allowed to remain until hatched. I have been credibly informed, both by natives and settlers living near their haunts, that it is not an unusual event to obtain half a bushel of eggs at one time from a single mound. . . . Some of the natives state that the females are constantly in the neighbourhood of the mound about the time the young are likely to be hatched, and frequently uncover and cover them up again, apparently for the purpose of assisting those that may have appeared; while others have informed me that the eggs are merely deposited, and the young allowed to force their way unassisted.

"One point has been clearly ascertained, namely, that the young from the hour they are hatched are clothed with feathers, and have their wings sufficiently developed to enable them to fly on to the branches of trees, should they need to do so to escape from danger; they are equally nimble on their legs; in fact, as a moth emerges from its chrysalis, dries its wings, and flies away, so the youthful *Talegallus*, when it leaves the egg, is sufficiently perfect to be able to act independently and procure its own food."

These birds have on several occasions made their mounds at

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the 'Zoo,' and the eggs have been successfully hatched. It was there noticed that an opening was always preserved in the centre of the circle of eggs, probably to prevent the danger of a sudden increase of heat either from the action of the sun or from too rapid fermentation of the decaying vegetable matter in the mound. The male bird constantly attended to the incubator, and on hot days cooled the eggs by almost uncovering them two or three times between morning and evening.

The young birds remained in the mound for at least twelve hours without making any effort to escape, but on the second day they came out and ran about the pen for some time. They went to bed again early in the afternoon, however, and were carefully covered up for the night by their father. On the third day they could fly well. It does not of course follow that the birds behave in the same way in their natural condition as they do in captivity, where they are imprisoned in a pen and so compelled to remain constantly beside their mound.

At the 'Zoo' the male Brush-Turkey took a very active part in constructing the mound, and perhaps he always does so, though the evidence on this point is rather conflicting. If he does not, there is reason to suppose that he at least acts as foreman of the works. At the station of a squatter in Queensland there was a tame cock *Talegallus* which lived with the farmyard Hens. He was in the habit of driving his companions together into a little grove of trees near the house, and the owner of the station was convinced that he was trying to compel them to build a mound. The Hens, however, did not understand that kind of nest, and they seized every opportunity to escape from their taskmaster, but the *Talegallus* always chased them back again, until at last his insistence became so troublesome that he had to be shot.

A remarkable feature of the Mound-Builders is the great size and strength of their feet. This is not so noticeable in the Maleo as in other species; but then the Maleo does not make a true mound, but, as we have seen, merely digs a hole in

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which to bury each egg as it is laid. Yet even in this bird the claws, though short and straight, form a broad and powerful foot; they are strongly webbed at the base, and this feature, combined with the length of the leg, helps to produce an admirable instrument for scratching. The birds which make true mounds, however, must be capable of more than mere scratching; in order to pile up these great structures they need a foot which can actually take hold of the material and fling it to a distance. So we find that the Brush-Turkeys have claws which are long and curved. The foot reaches its greatest development, however, in the Megapodes—a name which would at once lead you to expect a foot of more than common size.

All the Mound-Builders belong to the family of Megapodes, but the true Megapodes—the *Megapodii*—form a little group, a *genus*, apart from the Brush-Turkeys (*Talegalli*) and the Maleo-bird (*Megacephalon*). They have the most strongly developed 'scratching' organs to be met with in the whole of the bird world, and they know how to make good use of them. The birds themselves are about the size of small Hens, with very short tails, and though many of them have a crested head, their plumage is on the whole of a very dull and sober hue. Some of them construct immense mounds; the Australian Megapode (*Megapodius tumulus*), for instance, piles up material until it produces a hillock which not uncommonly measures as much as sixty feet in circumference, and sometimes a great deal more—a tremendous achievement for a bird. It is not to be supposed that one bird, or pair of birds, accomplishes such a gigantic labour in a single season; as in the case of the Brush-Turkeys, the Megapodes repair year by year to the same spot to deposit their eggs, and several pairs contribute to the building of the larger mounds; but even allowing for these circumstances, we must still be astonished at their extraordinary dimensions. Perhaps we shall get a better idea of their size from a remark of Macgillivray's: he tells us that some very

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ancient mounds have trees growing upon them, and he observed that in one instance the tree had a trunk which was a foot in diameter! All this sounds like a story from Gulliver's travels in the country of the Brobdingnagians—all except the very modest size of the bird itself, which only makes the story more wonderful still.

This Megapode is not at all particular about the nature of its building material, which varies according to the situation. The mounds are almost always near the edge of water. Many of them are found on the seashore and are composed of sand and shell heaped together in irregular masses, so that anybody who was not acquainted with their nature might suppose that they had been piled up by a heavy sea.

In such mounds there is nothing to develop heat, and the hatching of the eggs depends entirely on the warmth which they obtain from the sun. Others are found in neighbouring thickets or about the banks of creeks, and contain, as we might expect in these situations, fragments of decaying wood mixed with vegetable mould, the whole forming a cone-shaped mass which rather reminds one of a tiny volcano, especially when a crater-like hole has been dug in the summit by the birds when they come to deposit their eggs—or by the natives who visit the spot to rob them. There is a picture of one of these 'nests' in *The Romance of Animal Arts and Crafts* which shows a native armed with a sharp stick in readiness to begin digging out a supply of eggs. In the Solomon Islands the eggs of Brenchley's Megapode (*M. brenchleyi*) are very highly appreciated as an article of food. Mr. C. M. Woodford saw hundreds of these birds scratching out their holes in the warm sand when he landed at Savo, and they were so tame that they took very little notice of him. In this island, indeed, they become almost domesticated, and quietly go about their business of digging within a few yards of the native who is similarly engaged with the intention of getting possession of their eggs. They are so numerous here that thousands of birds congregate at the same

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place and form great laying-yards which often extend over several acres. These are open, sandy spaces on which no shrubs or undergrowth can obtain a hold, chiefly because the ground is continually being dug over by the birds. I think we must regard these clearings as the largest of all the bird 'incubators.'

The most scientifically constructed incubator, however, is that made by the Ocellated Megapode (*Lipoa ocellata*) of Australia, but as there is a full account of it in another volume of this series, and also a picture, we will here describe it quite briefly. The way this bird makes its incubator is by first scratching a hollow in the ground and then building in it a cup-like mass of leaves, dead grass, and similar material. The whole is buried under a heap of sand, and the decaying vegetable matter soon begins to warm up the incubator. Seven or eight eggs are then laid in the sand in a circle, just inside the rim of the cup—which we may, perhaps, call the heating apparatus of the incubator—a hole being dug by the birds for this purpose on each occasion when an egg is deposited, and then carefully filled up again with sand. It is curious to note that here again the eggs are not placed on their side like those of other birds, but in an upright position with the smaller end downwards. It would be interesting to know why this is so. We know that such eggs as those of a Plover are always placed in the nest with the pointed end turned towards the centre because in that position they fit more closely together, and occupy less space than they would do if arranged in any other way, and are therefore more effectively covered by the sitting bird; but nobody, so far as I am aware, has been able to explain the peculiar position of the Mound-birds' eggs.

Mound-birds' eggs are often buried at a great depth. Those of the Australian Brush-Turkey are found more than an arm's length below the surface, and the Australian Megapodes' were taken by Gilbert from a depth of six feet in the mound. The Brush-Turkey, however, does not dig straight downwards, but

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in a sloping direction towards the edge of the hillock, so that although the eggs are so far from the top, where the hole is always begun when the bird visits its incubator in order to lay, they might really be not more than two or three feet from the surface. But even if the young bird were to take the shortest way out of the mound, it would still have a great deal of burrowing to do, and it is surprising that it should ever be able to escape at all without assistance. Escape it does, however, though there is reason to believe that it sometimes remains buried a long time after leaving the egg. Some of the little birds which have been dug out are supposed to have been quite three weeks old when they were found; perhaps that is a mistaken estimate, but there seems no doubt whatever that many spend several days, at least, underground. One would expect them to die of starvation under such conditions, but on inquiry we find that occasionally, at all events, there is a supply of food conveniently at hand which may serve their needs during their imprisonment. When Gilbert first examined the mounds of the Ocellated Megapode he noticed that they contained large numbers of termites—the so-called ‘white ants’—which had even made their little covered galleries upon the eggs themselves; so that here there was plenty of tender food ready for the chick as soon as it was hatched.

A young Megapode is not a naked, helpless being like many little birds when they are first hatched; it is not, like an ordinary domestic chick, merely clothed in down. It is a powerful youngster with strong limbs which are already capable of vigorous scratching; it has wings with fully developed feathers and can fly, if not as well as its parents, at all events well enough to enable it to escape easily in a very short time from its enemies. Why then does it choose to remain so long underground, in darkness, instead of making its way as quickly as possible to the surface? That is a question which has puzzled many naturalists, and one which we are still unable to answer.

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Before leaving the fascinating subject of birds' incubators, as we have called them, we may perhaps mention a very curious instance, described by Dr. Merriam in his report on the Alaska Expedition, of the way in which the most tremendous forces of Nature may be of assistance in such a delicate process as the hatching of an egg. We have seen that the birds' incubators are kept warm in various ways. In some cases it is by the burning rays of the fierce tropical sun shining upon the dry desert sand, in some it is by the warming of the surrounding earth by hot-water springs, and in some by the heat produced when masses of dead vegetation, scraped together by the birds, ferment and decay. But there is yet another source of heat—a mighty source which, fortunately for us, only occasionally forces itself upon our notice, and which then is too often more apparently connected with destruction than with the fostering of life: the eternal furnace beneath the earth's crust. A little more than a century ago there appeared in the Behring Sea, amid thunder, earthquake and steam, a volcanic island now known as the Island of Bogoolof. This island had long been a favourite resort of countless multitudes of sea-birds when, in the year 1883, a companion volcano was thrown up from the sea.

The birds on the older island, the greater number of which were Murres, began to occupy the new land as soon as it was cool enough to afford a footing, and when Dr. Merriam first visited the island, eight years after its appearance above the waters, he found vast hordes in possession, standing by thousands on projecting points and ledges wherever the rocks were not too hot, and nesting there. No doubt the warmth of the rocks assisted the incubation of the eggs, but whether the birds took advantage of it to prolong their excursions on business and pleasure was unfortunately not ascertained. It seemed strange that the Murres should have chosen to make their homes in such a situation, for the sulphur fumes and hot steam were almost suffocating. The year after the volcano was

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formed, many birds were observed to be killed instantly if they chanced to fly into the cloud of steam and smoke which hung over it, and even when Dr. Merriam called at the island he found lying on the rocks many dead birds which had evidently perished from the same cause—the victims, as in the case of so many human pioneers, of their own enterprise.

CHAPTER IV

FEEDING THE CHICKS

Infant-food and why it is necessary—Finches—Change of diet and special preparation of food—‘Pigeon’s milk’—Insect-eaters—Swallows and Swifts—A ball of flies—Reed-Warblers—Industry of parents—A working day of sixteen hours—Feeding the young in mid-air—Methods of giving food—An interesting experiment—Birds-of-Prey—Larders—Fish-eaters—Fish soup—Perverted instinct of domesticated birds.

WE are aware that some young birds, such as Partridge chicks, are able to pick up their own food very soon after they leave the egg; all that their parents have to do is to take them where food is to be found and, just at first, to place it in front of them and move it about in order to attract their attention: the rest they can do for themselves. Many little birds, however, are born quite helpless, and in the early days, or it may be weeks, of their existence are entirely dependent on their parents, without whom they would very soon die of hunger, just as surely as a young mammal would die if it were not suckled by its mother.

We are aware that the food on which mammals live when they are grown up would not be good for them when they are quite young; at that time they need something which does not require to be crushed and softened before it is swallowed and which is suited to the powers of little bodies not yet fully formed; and it is just the same with many young birds. We all know what a sharp, strong, and hard bill a Sparrow has when he is old enough to fly about and pick up a living in the street or farmyard, to eat the seeds we have just sown in our garden, or to rob the farmer of his corn. But the bill of a

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baby Sparrow which has just escaped from the egg is quite soft, and so is his stomach ; his parents, therefore, acting instinctively as if they knew that seeds and berries and hard bread-crumbs would be injurious, give him nothing but soft food, and for a while he lives on worms and grubs and other delicacies. Sometimes the parents themselves take a fancy to a change of diet, and many hard-billed, seed-eating birds such as the Chaffinch become insect-eaters while they have a young family to provide for.

It is very interesting to watch the old birds when they visit the nest to feed their chicks, but it is often by no means an easy matter to do so. Frequently it is quite impossible, owing to the situation of the nest, to see at all what is going on there, and even in favourable circumstances it is often necessary to use a field-glass in order to get a good view. But if you are not discouraged by difficulties at first you will soon find that it is well worth while to take a little trouble.

On returning to the nest, some birds appear to have brought nothing at all back with them, but if we watch them closely we shall see that they presently begin to produce, one after another, caterpillars which are carried hidden away at the back of their throat. The Bullfinch, which is well known as a cage-bird—though less so now than formerly, I am inclined to think—and with which many of us are acquainted as an inhabitant of copses and bushy commons, has this habit.

Another way in which some of the seed-eating birds, such as the common Linnet, provide food adapted to the needs of their chicks, is by first softening the hard grain or seed in their own crops and thus producing what we may perhaps compare to a 'patent food for infants.' But a far more elaborate kind of infant-food is manufactured by those very dissimilar birds, Pigeons and Parrots. Different as they are in most respects, these birds resemble each other in so far as they are both strictly vegetarians, they both have particularly helpless babies, for whom they both produce this peculiar food.

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It is a whitish, half-solid, half-liquid material, rather like curdled milk in appearance, and on that account in the case of the Pigeon it has been called 'Pigeon's milk.' During incubation the lining of the bird's crop becomes thickened, and it is here that the 'milk' is produced in flaky curds. Just at first the young Pigeon is given no other kind of nourishment, but when it is a few days old a little partially digested food is mixed with the 'milk.' Then, as the young birds become bigger and stronger, the proportion of ordinary food is increased, so that by the time they are about a week or nine days old they are weaned from the 'milk' and are being fed entirely on ordinary food, which is still, however, softened for them by their parents. It is a curious fact that in the early days the old birds are able to force the 'milk' from the crop without any mixture of their own food, although later on both are mingled together.

The way in which a Pigeon gives food to its young is well known. It takes the bill of the squab (as a baby Pigeon is called) in its own and pumps up the soft food with a curious action familiar to all who have kept these birds as pets. The beak of a young Pigeon is well adapted for this kind of feeding, for it is not only soft and fleshy, but much thicker and larger in proportion to the size of the body than in after life. At first, indeed, it looks immense, but gradually, as the time approaches for the young bird to take to solid food and provide for itself, it shrinks and hardens.

It is interesting to note that both Parrots and Pigeons often show their affection for their mate by feeding her in the same manner. Parrots, indeed, as well as their near relations the Macaws and Cockatoos, sometimes go further, and produce food from their crop merely because they are very fond of the person who feeds them—an attention which is not always appreciated!

The Blue-bellied Parrakeet (*Psittacus cyanogaster*), as well as some others of the family, constantly feeds his mate while

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she is brooding, in the same way as the young. A pair of these birds observed by Levaillant continued for half a year to feed their two young ones, though the latter had left the nest when three weeks old—which, for Parrots, is very early. He states that it was a very interesting and beautiful sight to watch them, for the young would frequently be seated on a branch on the further side of their mother, and the male bird, being unable to reach quite so far, presented the food first to his partner, who immediately passed it on to the young.

Let us now take leave of the vegetarians amongst birds and turn to those whose ordinary diet consists of insects. Of these, the most familiar are probably Swallows and Swifts—not, we may remark in passing, coupled together here because they are closely related to one another, as they are so commonly and erroneously supposed to be, but merely on account of the similarity of their habits. Who has not watched these graceful birds on a summer evening skimming in long, beautiful curves through the air, sometimes high above our heads, sometimes, in the case of Swallows, quite close to the ground, in rapid, untiring flight? You may even have noticed the sharp little sound made by the snapping of their bills as, without the slightest interruption of their progress or slackening of speed, they capture a gnat or other minute insect—just what it is that they catch we can rarely tell, for though it is distinct enough to the birds' keen sight, to us it is invisible.

We will in imagination accompany one of these birds to the nest where a brood of hungry youngsters is awaiting its return. Suppose it is the Swift that we visit. That is much easier in imagination than in reality, for Swifts often make their nest in high towers, though occasionally they are less aspiring and are content to establish a home under a roof at no great height from the ground, as they did at my old school. The brood is a small one (two eggs being the usual number, though occasionally three are laid), but the old bird has been absent from the

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nest quite a long time, perhaps for a whole hour, so the chicks are very hungry ; what has he brought them for supper ? As he creeps in at the narrow opening under the eaves it is not apparent that he has brought anything at all, but there is a curious swelling under his chin which certainly looks as though he may perhaps have something hidden in his mouth. And so he has, for presently he opens his widely gaping bill and produces a round black object about the size of a boy's marble. What can it be ?

(I recollect, when I was a boy, catching a Swift which flew one evening through the open window of the schoolroom and was unable to find its way out again—the window having been promptly closed as soon as it appeared. And I remember how puzzled I was by the pouch-like swelling under its bill, until in its struggles the bird ejected from its mouth a huge pellet such as I have described, which, to my astonishment, I found to be composed of scores of small black flies all glued together in a solid mass. On the same occasion, before liberating the captive, I learnt for the first time that Swifts in their turn are persecuted by flies—horrible, wingless flies which infest their bodies, comfortably hidden away under the feathers, amongst which they glide with surprising rapidity if disturbed ; and I still vividly recall my feeling of disgust on making this discovery and my pity for the victim of such loathsome parasites, which appeared of monstrous size to live on so small a bird. This, however, is a digression, and we must return to the subject of feeding the young.

Swifts, then, take to the nest a large number of flies at once, all stuck together in the form of a pellet or ball which is carried under the tongue. They therefore feed their chicks at comparatively long intervals, except just after they are hatched. Swallows and Martins, on the other hand, are continually feeding their families (which are more numerous than those of the Swifts) and may be seen returning to the nest every two or three minutes. In this they resemble the greater number of

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insectivorous birds, whose industry in supplying the needs of their young is almost incredible.

On the opposite page you will see a charming illustration of a pair of Reed-Warblers clinging to the reeds over their nest and looking down upon their family which they have just been feeding. It is from a photograph of the living birds, taken in a reed-bed beside an old fish-pond a few miles from Cambridge. Photographing birds in their own haunts is work which requires much time, and patience too, but it has the advantage of affording ample opportunities of observing their habits. Mr. Farren, who took this particular photograph, was watching the Reed-Warblers for an hour and three-quarters, and during that period they visited the nest at least thirty-six times, bringing with them caddis-flies, little Cambridge-blue dragon-flies, and other insects. That works out at about twenty visits in an hour; and on almost every occasion the birds brought food with them. The feeding is continued throughout the day, from sunrise to dusk—a summer-day-long feast of hundreds of courses! Imagine the energy and industry of the little birds which provide such a meal.

We do not merely *suppose* that the birds never rest from their labour of love all through the day, for patient naturalists have often kept a nest under observation from early morning until the time of roosting, and have made a note of every occasion when the parents brought food. In this way Professor Weed of Durham, New Hampshire, found that a pair of Chipping-Sparrows—American birds much like our Sparrows in general appearance, but considerably smaller, and familiarly known as ‘Chippys’—between five minutes to four in the morning and half-past seven at night made almost two hundred visits to the nest, and during this busy day they brought food—soft-bodied caterpillars, crickets, crane-flies, and other insects—on nearly every occasion, though sometimes they returned with what appeared to be grit for the grinding of the food. There were no long intervals when the birds were not at work;



DEVOTED PARENTS: REED-WARBLERS AT HOME

Reed-Warblers build their nest over the water, weaving the walls securely round the supporting reed-stems. When the young are hatched the birds spend the whole of the long summer day in feeding them, returning every two or three minutes with their bills full of insects.

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the longest was twenty-seven minutes, and in the middle of the day as many as twenty-one visits were made in the hour.

But to return a moment to our Reed-Warblers. Mr. Farren writes: "It was very interesting to watch the olive-plumaged little birds working among the reed-stems; flitting from reed to reed, they would disappear through the jungle behind the nest, returning in two or three minutes with their bills full of insects and, clinging sideways on the upright reeds above the nest, reach down and deliver to the young the food they had brought. While attending to the nest each parent had its favourite perch; the female, which was the more industrious of the two, always settled on the reeds on the left of the nest, while the male kept to the right. The male also perched lower down than did the female; in fact, at times the latter bird clung to the reed so high above the nest that she could only reach the open mouths of the young ones by hanging in a position which may very well be described as 'upside down.'" She could apparently swing herself into almost any attitude without changing the position of her feet.

The moment when a bird has just given food to the young is with nearly all small kinds the surest time to get a good photograph, because it then usually remains for a second or two quite still, watching the chicks.

With regard to the Swallow, there is a remarkable circumstance in connection with the manner in which it gives food to its young which we have so far omitted to mention. When the fledglings are old enough to leave the nest they are fed for a day or so on the chimney-top, after which they are taken a little further afield, often to a dead branch of a tree, where they sit in a row and are waited on by their parents. Their education is progressing, but they are still unable to capture their own food, although by this time they will have learnt to fly, and it is at this stage in their upbringing that we may see the pretty act so well described by Gilbert White—the young being fed by their parents while on the wing. "They play

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about near the place where the dams are hawking for flies ; and when a mouthful is collected, at a certain signal given, the dam and the nestling advance, rising towards each other, and meeting at an angle ; the young one all the while uttering such a little quick note of gratitude and complacency, that a person must have paid very little regard to the wonders of nature that has not often remarked this feat."

Martins also feed their young flying, but not so commonly as Swallows ; and the action is performed so swiftly that it usually escapes the notice of any one who is not a very quick observer.

A few years ago, when I was in Tangier, I was so fortunate as to have an opportunity of observing a pair of Wrynecks which were bringing up a young family in a hole in a tree, and frequently saw them busily engaged at an ants' nest taking in supplies for the family. The tip of the bird's tongue is very horny, and it uses this as an implement to stir up the ants and induce them to sally forth to defend their home. As they appear the bird gathers them wholesale into its mouth, where they are stuck together into a ball by means of the copious viscid saliva, exactly as in the case of the Swift, and the nutritious cake is then conveyed to the nest and dropped, I suppose, into the gaping mouths of the young Wrynecks.

These birds, which are slightly larger than a Sparrow, nest in some parts of England, where they arrive a few days before the Cuckoo and on that account are occasionally known as 'the Cuckoo's mate.' But as the hollow trees in our orchards, where they love to make their home, become fewer, the birds become rarer year by year, and they are now seen far less frequently than was the case fifty years ago. They are called Wryneck, or in some places 'Snake-bird,' because they have a wonderful way of twisting and writhing their head and neck, which is especially noticeable when one of the birds is caught and held by the feet. It is an easy matter to capture them while in the nesting-hole, and they would no doubt be molested more frequently than is actually the case but for the threaten-

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ing hiss with which they greet an intruder. Yet another snake-like characteristic of these curious birds is the rapidity with which the tongue is darted out when they are collecting insects.

Amongst Wrynecks both parents take a share in feeding the chicks, but with many species, such as the Skylark, the hen-bird alone performs this duty.

When young Skylarks are almost ready to leave the nest their mother feeds them about four times in every hour. Her return is heralded by a gentle twitter as she hovers above them for a few moments, "like a toy-bird suspended on the end of a bit of elastic," as Mr. Kearton happily describes her attitude at this time. The youngsters answer the call by shooting up their heads and opening wide their yellow mouths, whereupon the mother alights and gives one of them the worm she holds in her bill, after which, like a conjurer, she produces from somewhere at the back of her throat more worms and feeds the little ones in turn. The father's duty appears to consist merely in providing incidental music during and between the courses.

It is easy to observe the way in which a brood of callow nestlings respond to their parents' invitation to be fed, by paying a visit to a nest of young Thrushes, Hedge-Sparrows, or other common species, and imitating the sound made by the old birds. It need not be a particularly good imitation; the young birds are not fastidious, and are pretty sure to answer promptly by stretching their necks and gaping widely in anticipation of a meal. In many cases it is possible to get the same result by gently tapping the side of the nest or the twig on which it is supported, producing a swaying or vibration such as would be caused by a bird alighting. This can be repeated often, the chicks instinctively responding with a regularity which is ludicrously suggestive of the working of a mechanical toy when the spring is pressed. If, however, one of the old birds is anywhere about, uttering the alarm note, you will probably whistle or chirp or tap in vain, for the youngsters will cower down in the nest and remain still until you go away

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and they are assured by their anxious parent that the danger is past.

Most of the insect-eaters either drop the food into the mouths of their young or place it well back in their throats. The Nightjar, however, whose diet consists chiefly of moths and cockchafer, feeds its callow nestlings from the crop after the manner of Pigeons, but with this difference, that whereas the Pigeon takes the bill of the squab within its own, the Nightjar adopts the opposite plan and places its own bill in that of its young. In both cases there is the same jerking, up-and-down movement as the food is transferred from one to the other.

The Birds-of-Prey, on account of the nature of their food, feed their chicks less frequently than the birds we have hitherto mentioned. They bring in their supplies in bulk, consequently the young have substantial meals at longer intervals rather than a series of small courses spread over the whole day. Many of them carefully prepare the game before giving it to the young birds to eat. In Montana, for example, it has been noticed that the Golden Eagle always decapitates any small animals which it brings to the brood, but in the case of feathered prey, in which the skull is not so hard and unmanageable, the head is left on. Hares are *plucked*—a method of preparing this kind of game for the table which we usually only associate with the ancient story of the inexperienced cook. An Eagle's larder is kept well filled, for portions of dead animals are nearly always to be seen around the margins of the eyrie, and the young grow up literally 'in the midst of plenty.'

Reference to the Eagle's larder brings to mind the curious larder of the Red-backed Shrike (*Lanius collurio*), one of the summer visitors to England and the south of Scotland, better known by its popular name of 'Butcher-bird.' Its nest is usually placed high in a thorn bush, and on the surrounding thorns the bird impales the prey which it captures. Though considerably smaller than a Thrush it is very bold, and will even attack and kill other small birds, though the greater part



THE BUTCHER-BIRD'S LARDER

The Butcher-bird impales its prey on thorns, and the remains of many victims may often be seen on a favourite thorn-bush. The "larder" represented in the picture contains a beetle, a lizard, a young Blackbird, a Blue Titmouse, and a Hedge-Sparrow.

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of its food consists of large insects which it catches, after the manner of a Flycatcher, by making quick dashes from the twig where it sits perched and watchful. It kills even when its appetite for food is satisfied, and hangs up its victims for future consumption, dragging them on to the sharp thorns with its feet and strong bill, which is hooked and notched like that of a Bird-of-Prey. A strange variety of game is sometimes collected in the 'larder'; in one instance the bird had hung up a lizard, a dor-beetle, a Hedge-Sparrow, a young Blackbird, and a Blue Tit. Small frogs, mice, and humble-bees are amongst the other animals occasionally found there.

That charming little bird, the Dabchick, is remarkably careful about its children's diet. During the first fortnight of their life this consists mainly of fresh-water shrimps and such-like delicacies. The mother exercises careful supervision over the meals; if a fragment of food appears to be too solid for the little ones, she bites and crushes it in her bill to make it softer before giving it to them; if, having given it to them, it seems after all rather too large for them to manage, she promptly takes it away again. The Eider-Duck also carefully prepares the nursery dinner. Taking her brood of ducklings to a spot where edible mussels cover the rocks at low-water mark, she gathers as many as the family meal requires and, choosing the smallest, breaks the shells and lays the contents before her children.

Of the fish-eaters by far the greater number bring home the food in their gullet, though the noblest of them all, the Sea-Eagle, always carries its prey in its claws, and often brings to its young fish which are still alive. In Hungary, Prince Rudolph saw a Sea-Eagle flying home with a fish in each claw: on arriving at the nest it threw one of them to its young, and the other it took to a branch for its own supper.

Hérons, Gannets, Cormorants, Petrels, Pelicans, and a host of other species, all carry the fish in their gullet, and allow the young to help themselves. Morning and evening the Heron

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flies home heavily from its fishing with laden crop, alights at the top of the tree, flaps its wings to recover its balance, and descends to the nest. The young, one after another, then put their beaks into their parent's and take the food—consisting not only of fish, but of frogs, small reptiles, shell-fish, and even young water-fowl—to an accompaniment of hoarse squeaks. The Brown Pelicans also feed their brood morning and evening. In the case of these birds, as in the Cormorants and others, the head and neck of the young are thrust far down into the parent's gullet in a way that is unpleasantly suggestive of possible cannibalism on the part of the old bird! It looks a most uncomfortable attitude for both parties, but they appear to derive much satisfaction from the operation.

In these and many other instances the young are fed at first on food which has already been partially digested, and are only gradually weaned to a more solid diet of fresh fish. The Gannet in its earliest days is nourished on a kind of fish soup prepared in its parent's gullet and stomach, and introduced a little at a time into the young bird's throat. The Petrels, which have such an unpleasant habit of bombarding any one who approaches them too closely when they are on the nest with a jet of evil-smelling oil, the odour of which clings to clothing for days afterwards, feed their young on the same unattractive fluid.

Even young birds have been known to submit to having their crops emptied by another nestling. Audubon has a story of two young Darters or Snake-birds—the species whose fishing is described in another chapter—which were kept in a cage, and relates that the smaller of the two when hungry worried his brother so persistently that at last the latter allowed him to put his head right down his throat and steal the fish which he had previously swallowed.

Chicks that grow quickly have prodigious appetites. The experience of a member of the *Discovery* Expedition, who attempted to bring home two baby Emperor Penguins from the

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Antarctic, is an amusing illustration of this. The little birds were very exacting, and made a great hullabaloo when they considered that meal-times had arrived. They were fed at first on crustaceans and afterwards on seal-meat, both of which had to be chewed up for them by their nurse.

This was no light occupation, for Captain Scott says that from the beginning they had to be regarded as small tanks, and that when they grew bigger they seemed to be bottomless caverns into which any quantity of food could be dropped without making much appreciable difference. After a while they began to disapprove of the long interval between supper and breakfast, and "used to go off like alarm clocks" in the middle of the night. Their nurse had then to get out of his warm bed—we may mention that he had from the first handed over his sleeping-jacket to his charges to protect them from the cold—and give them a meal: which meant that he had to chew seal-meat for them until they were satisfied, when their little heads would sink upon their distended bodies and they would sleep again until breakfast-time.

In a former chapter I mentioned that Ostrich eggs are often found scattered about the ground in the neighbourhood of the nest. It is said that when the young are hatched these scattered eggs are made use of by the parent birds as a sort of infant-food for their chicks; and that may well be so, for the shells are so thick that the contents keep perfectly fresh for several weeks.

Such, then, is the devotion of birds in appeasing the hunger of their little ones. It is only when they have been demoralised by domestication that they occasionally lapse into selfish conduct and allow their own greed to get the better of parental affection. For example, some years ago a Duck on the Long Water in Kensington Gardens used to seize her ducklings by the neck and hold them under the water until she was herself obliged to come to the surface to breathe, if they ventured to accept the crumbs thrown to them by a bystander.

CHAPTER V

DEFENCE OF HOME AND FAMILY

Change of character in breeding season—Courage and endurance—Braving cold, water, fire, famine, etc.—Intimidation—Strategy: the wiles of a Woodchuck—Attitude of an angry bird—Animals attacked by nesting birds: cats, dogs, pigs—Birds-of-Prey—Courage of Owls—The redoubtable King-bird—‘Bonxies’ and bonneting—An unpleasant habit—One of Nature’s comedians.

AT the season of the year when they are chiefly occupied with family cares, birds not only put on braver attire, but change their character in harmony with the alteration in their plumage. The difference in the plumage, however, may in some cases be so slight as to pass almost unnoticed; but the contrast between the behaviour of a bird which has a home to defend and the same bird at other times is usually very remarkable indeed. However timid and spiritless it may have been, however ready to take to flight on the slightest alarm, it becomes pugnacious, aggressive, and often almost reckless in its courage. The Hen which, a few weeks before, ran fluttering and clucking across the farmyard pursued by a puppy, will not only stand her ground when she has a helpless brood to defend, but will fly in the face of any dog that dares to come near her precious charge. In many species it is the male bird who shows most devotion to the little ones, and he may be no less determined in defence of his mate when she is sitting on the nest—or perhaps it is the nest he is thinking of rather than his partner; in any case, the result is the same.

The way in which birds protect their nurseries or little ones

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varies in different species; threats, force, and strategy all play their part, and may all be adopted by the same bird at different times, though usually we find that each species has its own particular method or combination of methods from the practice of which it rarely departs.

Devotion to its eggs, mate, or young is sometimes so overwhelming that a bird becomes entirely oblivious to its own safety. That famous naturalist, Thomas Edward—whose books you should read if you have not already done so—relates how, when crossing the Clasmauch on his way to Huntly after a heavy snowstorm which had compelled the Plovers and Wild Ducks to abandon their nests, he came upon one of the latter birds skulking, as he thought, beside a tuft of rushes. On approaching, however, he saw that she was dead, and there, beneath her lifeless body, was a nest with eleven eggs, each of which contained a young bird. It was evident that the poor Duck had died, half suffocated and half frozen, in the effort to protect her nest from the heavy fall of snow. That is an instance of passive endurance carried to the utmost limit; for the sake of their young or mate, however, birds exhibit active daring in no less a degree. We will take one or two homely instances of this.

Everybody knows that a Hen is a most devoted mother, and we shall have something more to say on this subject presently. In the farmyard her devotion results occasionally in some very curious situations, because not infrequently she is given a sitting of Duck's eggs to brood over, and when they are hatched the habits of her strange family are a terrible puzzle to her, and the source of much anxiety. This is especially the case when the whole brood, in spite of all her protests and her excited clucking, take to the water and swim beyond her reach, leaving her in a state of comical alarm on the edge of the pond. A case is recorded, however, of a Hen whose anxiety so far overcame her fear that she actually leapt into the pond in pursuit of her rebellious foster-children, and

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managed to swim to the other side—a distance of twenty feet.

Few birds are more cautious or more knowing than old Rooks and Crows, and to approach them openly within gunshot, if you are carrying a gun, is almost impossible—so difficult, indeed, that there is a tradition to the effect that they can smell powder! They have at all events learnt to distinguish a gun from a stick, for while they regard the latter with indifference, they take care to keep just beyond range of firearms. Yet even the wily Carrion-Crow falls a victim to parental affection. Mr. Cornish tells us that in the nesting-season he used to organise evening ‘drives’ of Crows in order to try to reduce their numbers before their destructive tendencies were further stimulated by the possession of ravenous families. On such an occasion, as soon as a shot was fired, one of the old birds came hurrying home to the nest to see what was happening, and immediately fell to the guns. A moment afterwards the other bird was seen, in the dim twilight, to descend straight on to the eggs, with the same fatal result.

This recalls the devotion of the Raven—made famous by Gilbert White’s description—which had its nest in Losel’s wood, at Selborne. We will give the story in his own words: “In the centre of this grove there stood an oak, which, though shapely and tall on the whole, bulged out into a large excrescence about the middle of the stem. On this a pair of ravens had fixed their residence for such a series of years, that the oak was distinguished by the title of the Raven-tree. Many were the attempts of the neighbouring youths to get at this eyry: the difficulty whetted their inclinations, and each was ambitious of surmounting the arduous task. But when they arrived at the swelling, it jutted out so in their way, and was so far beyond their grasp, that the most daring lads were awed, and acknowledged the undertaking to be too hazardous.

“So the ravens built on, nest upon nest, in perfect security, till the fatal day arrived in which the wood was to be levelled.

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It was in the month of February, when those birds usually sit. The saw was applied to the butt, the wedges were inserted into the opening, the woods echoed to the heavy blows of the beetle or mallet, the tree nodded to its fall; but still the dam sat on. At last, when it gave way, the bird was flung from her nest; and, though her parental affection deserved a better fate, was whipped down by the twigs, which brought her dead to the ground."

Amongst wild birds it is well known that the larger kinds exhibit most shyness at the approach of man; contrary to what one unacquainted with their habits might expect, the smaller the bird, the greater its fearlessness. If we bear this in mind it is not very surprising to find that some of the smaller species will endure a considerable amount of close observation when on the nest without taking to flight: we might easily give numerous examples, but one will suffice. Many years ago, a nest which had been built by a pair of Martins under the eaves of a house at Sutton was partially destroyed, as such nests often are, by a violent thunderstorm, and two little, unfledged birds fell to the ground. The owner of the house saw that they were apparently uninjured and considered what could be done to repair the damage. A ladder was brought to the spot and a piece of board was nailed up under the nest, which was then mended very carefully with clay. A little cotton-wool was put in to make good the damaged lining, and the young birds were replaced in the nest. Now all these operations necessarily caused a great deal of disturbance, yet during the whole time the parent bird never left the uninjured portion of the nest, but remained sitting there quietly until the work was finished, when, as if overcome by thankfulness for the kindness she had received, she flew around chirping cheerfully for several minutes.¹

While birds which have discovered the advantages that houses and other buildings afford them as a nesting-site enjoy many benefits from their association with man, they have also

¹ Sterland's *Birds of Sherwood Forest*.

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to encounter the dangers of civilisation—dangers to which they are not exposed, or at all events but rarely, away from human habitations. One of these is the danger of fire, from which, for helpless nestlings, there is no hope of escape. The conduct of the parent birds in such circumstances amounts in many recorded instances to absolute self-sacrifice. We know that in Germany and elsewhere the bird which has most conspicuously attached itself to human dwellings is the White Stork, and a box or an old cart-wheel is frequently placed for its accommodation on roof or chimney by the householder. The bird is regarded as the type of a devoted parent; and so indeed it is, as the following instance goes to prove. At Neuendorf, in Prussia, a barn on which a pair of Storks had for years brought up a family was struck by lightning. The nest, a great heap of sticks big enough to make a good bonfire, at once burst into flames, but instead of flying to a place of safety, as she might have done, the mother Stork brooded over her helpless, screaming nestlings as if to protect them, and she and they together died amidst the flames. If you have read *A Tramp Abroad* by Mark Twain you may remember that he quotes in the Appendix an account of a similar incident which was related in a Mannheim journal.

Turning again to the smaller birds, American Chimney Swifts (*Chaetura pelagica*) have on more than one occasion been seen to enter chimneys, where their nests were situated, when the house was on fire and the roof surrounded by flames. These birds have also been known to show their attachment to their young in a way which is somewhat unusual amongst birds which migrate, for it has often been remarked that great numbers of the young of such birds perish every year because the belated broods are not ready to leave the nest when the time comes for their parents to join the rest of their kind in their long flight to winter quarters, and as the migratory is usually even more powerful than the parental instinct, the young are left behind to starve.

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Some years ago, however, a writer in *Forest and Stream* recorded how, a month after the Swifts had departed, he heard the familiar twitter of these birds in his chimney, and on taking down the fire board, found a young Swift attached by a horse-hair to a fallen nest. The mother bird entered the chimney and waited quietly while the thread was cut and the prisoner set at liberty. In about an hour the young one got the use of its legs and very quickly learnt to fly, so that at length the two birds were able to start in company on their lonely journey to a warmer climate. The parent had in this instance chosen to remain behind with her young one when all the rest of her companions were leaving the country, and had it not been for the timely assistance which they received both birds would no doubt have died of hunger, for insect food was already scarce.

We will now consider some of the means by which birds attempt to defend their young from hostile intruders. In the first place, then, many kinds try to ward off attack by threats, that is to say, by making themselves look as dangerous as they can, and by uttering strange sounds which no doubt often result in frightening away the enemy. "Nightingales," says Gilbert White, "when their young first come abroad, and are helpless, make a plaintive and a jarring noise: and also a snapping or cracking, pursuing people along the hedges as they walk: these last sounds seem intended for menace and defiance." A method which is much practised by birds which make their nests in holes in trees is to hiss like a snake—an effective procedure which has often prevented a nest from being plundered, for who would willingly put his hand into a dark hole which apparently is the home of a brood of young snakes? The Wryneck and the Nuthatch both adopt this plan.

The latter bird often nests in the deserted hole of a Woodpecker, taking care to plaster up the entrance until there is no room for the much larger Woodpecker to enter the cavity. If it be disturbed when occupying this stronghold, it fights

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most vigorously, striking with wings and bill, and hissing at the same time in a very terrible manner.

While discussing birds which nest in holes in trees, and the way in which they behave when they are surprised while on the nest, it may not be out of place to relate a little episode in the life of a family of California Screech-Owls (*Scops asio bendirei*) whose abode was a hole which had been made by Woodpeckers in a cottonwood tree. The nest was discovered by Mr. Gault, who found, on inserting his hand, that it was occupied by the parent bird and four nestlings about ten days old. As the mother bird was seized and forcibly removed from her home, she grasped one of the young family in her talons, and this in its turn took hold of another, and so on, with the result that in their efforts to resist eviction, they formed a continuous living chain of Owls which presented a very ludicrous sight as it came dangling out of the hole.

The behaviour of Woodpeckers themselves is by no means devoid of interest. There is a species called the Pileated Woodpecker (*Picus pileatus*), but more popularly known, in common with the Red-bellied Woodpecker, as the 'Woodchuck,' which is found over almost the whole of North America. This splendid bird, which is unfortunately now becoming rare, is a very powerful and artistic workman, and it is said that when it is cutting a hole in a tree-trunk for the purpose of making its nest, it often removes the traces of its presence by carrying away the chips and scattering them at a distance. Those who have read *The Romance of Animal Arts and Crafts* will remember that some of the carpenter-ants take similar precautions against discovery. According to Dr. Ralph, the Woodchuck can, on occasion, act in a still more remarkable manner with the object of protecting its home. One spring, in Florida, Dr. Ralph found a nest excavated in a dead cypress tree, and rapped on the trunk to ascertain whether the bird was at home. The Woodchuck immediately put his head out of the hole and dropped some chips, whereupon the doctor con-

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cluded that the carpentry was still going on and that the nest was unfinished. As the same thing occurred on several subsequent visits he decided to examine the nest in any case, and on doing so he was surprised to find that it contained a brood of young birds, very nearly full grown! The chips, then, had apparently been thrown out by the old bird with the object of deceiving him—of hoodwinking the intruder, that is to say, concerning the advanced state of family life.

In America, where Cuckoos take a more serious view of their responsibility than does the light-hearted vagabond with which we are familiar in England, the shyest amongst them become bold when their nest and eggs are in danger. The Yellow-billed Cuckoo, for instance, when on the nest will often raise its feathers until they stand out at right angles to its body, "like quills upon the fretful porcupine," not from fear—for a bird that is alarmed depresses its feathers close to the body and makes itself as small as possible—but from anger. This Cuckoo is at ordinary times a timid bird, but it has been known to fly fiercely at an intruder upon the privacy of its home. In such circumstances, and especially if there are young ones in danger, birds will often boldly attack their most inveterate enemies. A Blackbird has been seen to attack a cat which had caught one of its fledglings, and by pecking vigorously and beating her wings in the cat's face, to compel her to release her prey. The Game-birds are as plucky as any in this respect, and most sportsmen are aware that a Partridge will often 'stand up to,' and even drive off, a terrier. In America the Ruffed Grouse is equally plucky. Captain Bendire saw a hen of this species attack an Indian dog and absolutely make him turn tail and slink away, by sheer force of character and reckless fierceness. Every feather on her body stood on end, and she hissed like an angry cat, pecking the dog's head and legs and moving to the attack with such agility that he was glad to make an ignominious escape from her fury.

Just as much determination is shown by the male bird in de-

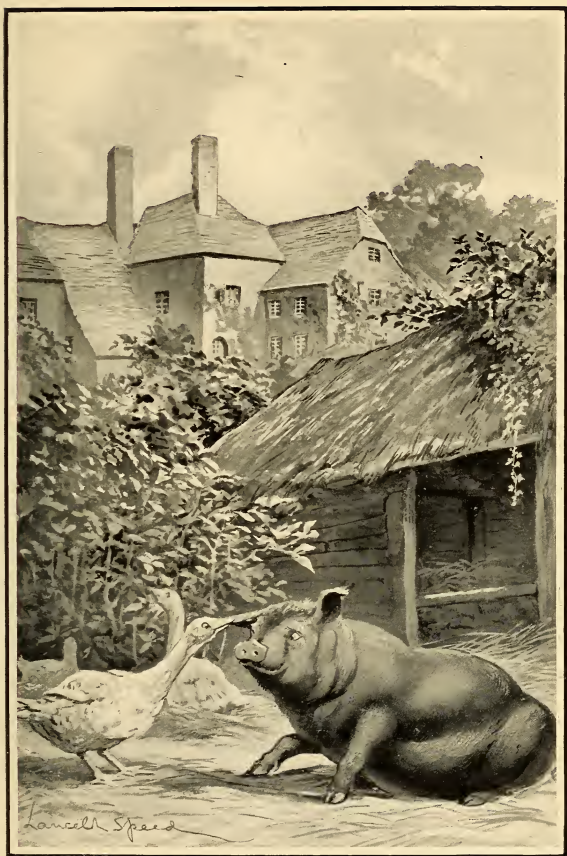
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fence of his mate when sitting. Gilbert White recorded in his diary, March 21st, 1783, "My Goose sits, while the Gander with vast assiduity keeps guard, and takes the fiercest sow by the ear, and leads her away crying." So it is, too, with wild Geese. The male Grey-Lag faithfully watches beside the Goose and guards her all the time she is sitting, and the male Canada Goose will resolutely face the greatest peril while he urges his wife to fly from the nest, standing his ground bravely until she has reached a place of safety, when he also takes to flight.

Many are the tales which have been told concerning the dangers which beset the man who dares to attempt to rob the Golden Eagle of its young or eggs: stories of the majestic birds swooping down in righteous anger and fiercely attacking the robber as he hangs perilously suspended from a slender rope over the face of the rocky cliff where the birds have their eyrie, or clings precariously to a narrow ledge. It is very doubtful, however, whether there is any foundation whatever for these adventurous tales, for Golden Eagles, though courageous enough, appear to possess but little parental affection, and I have never come across a really reliable account of these birds making the least attempt to defend their young. Usually they fly away and either disappear from sight altogether or watch the robbery from afar. All Birds-of-Prey do not behave in this callous fashion, however; some of them have a way of swooping down close to the head of any person who approaches their nest and uttering ear-piercing shrieks, but they seldom actually make an attack.

There are, however, exceptions, and it is well for the intruder to be prepared for emergencies. Robbing an Osprey's nest is a dangerous proceeding, and some of the Goshawks are particularly vigorous in their attacks on any one who ventures to climb towards the nest. Usually the female alone is the defender of the home, but occasionally, as with the Sharp-shinned Hawk, male and female join forces and buffet the egg-collector rather severely.

What might be the result of one of the larger Birds-of-Prey coming down upon a man's head from a great height it is



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"My goose sits, while the gander with vast assiduity keeps guard, and takes the fiercest sow by the ear, and leads her away crying."

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difficult to say, but if one may judge by comparison with the impression produced by an Owl, it would be far from agreeable, as the following incident, which occurred in the neighbourhood of my own home, will show. One evening a gentleman was walking through a wood beside a small lake when a young Owl fluttered past him and alighted on the ground. Without difficulty he caught the little bird under his cap; but just at that moment a strange thing happened. As described by himself, he was apparently "struck on the head by a brick," and was so disconcerted that his captive was allowed to escape; but what had really occurred was that one of the old birds had come to the rescue of her young, and had very successfully pounced down upon the head of its captor.

The Owls, indeed, are a brave family, and if it would not be too tedious we might, I think, without much difficulty, show that scarcely a single species is devoid of courage. We must be content with one more instance before passing on to a different aspect of defence. In this case a dog and his master were passing within a short distance of the spot where a pair of Short-eared Owls (*Asio accipitrinus*) had their nest. Both birds set to work to drive away the dog by swooping upon him from side to side and striking him on the back with their wings. He was not accustomed to birds conducting themselves so boldly, and he beat a hasty retreat, pursued for some distance by the angry Owls, who then turned their attention to the dog's master and endeavoured to drive him away also by swooping very close to him and snapping their beaks.

So far we have been mainly concerned with the various methods of defence adopted by birds, great and small, against man and mammals. But there are other enemies, of their own race, to be encountered, and here again we constantly meet with instances of impetuous daring. The most remarkable of them all is the behaviour of the King-bird (*Tyrannus tyrannus*), one of the best-known birds of the United States, during the summer months. He is not a large bird—rather smaller,

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indeed, than our English Blackbird; nor is he particularly showy, though his black back and white front and his little flame-coloured crest, which in repose lies half hidden, are handsome enough, when added to his bold and confident bearing, to give him a very gentlemanly and even noble appearance. As for song, his shrill twitter is hardly worthy of the name. What is it, then, that makes this little bird so very remarkable? It is this: from the moment the foundation twigs of his big, compact nest are laid, until the day when his young family are able to fight their own battles, he divides his time between feeding and entertaining his mate and little ones and giving battle, from morn till night, to every bird that ventures anywhere near his precious nest. His impetuosity is irresistible, and he attacks every intruder without discrimination. Even cats quickly learn to shun the neighbourhood.

“In the months of May, June, and part of July,” says Wilson, “his life is one continued scene of broils and battles; in which, however, he generally comes off conqueror. Hawks and Crows, the Bald Eagle and the great Black Eagle, all equally dread a rencontre with this dauntless little champion, who, as soon as he perceives one of these last approaching, launches into the air to meet him, mounts to a considerable height above him, and darts down on his back, sometimes fixing there to the great annoyance of his sovereign, who, if no convenient retreat or resting-place be near, endeavours by various evolutions to rid himself of his merciless adversary. But the King-bird is not so easily dismounted—he teases the Eagle incessantly, sweeps upon him from right to left, remounts, that he may descend on his back with the greater violence; all the while keeping up a shrill and rapid twittering; and continuing the attack sometimes for more than a mile, till he is relieved by some other of his tribe equally eager for the contest.” There appear to be but three birds which are able to contend with this champion: one is the Purple Martin (*Progne*), whose marvellous powers of flight enable him to escape; another

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is the Red-headed Woodpecker, who greatly irritates the little tyrant by his skill in dodging him round the perch where he has taken refuge, and apparently much enjoys the game; and the third is a little Humming-bird, which simply defies this conqueror of Eagles, and is said very often to come off best!

Even an ordinary farmyard Hen has been seen attacking a Hawk, which was on the point of carrying off one of her chickens, with such force as to throw the marauder on its back, whereupon she continued the fight with feet and bill so effectively that Audubon, who relates this story, was able to secure the Hawk before it could escape from the infuriated mother.

Some of the Ducks are hardly less devoted, but it must be admitted that the drakes *are*, for they are constantly in the habit of shirking their responsibilities and leaving all the care of the brood to their mates. If disturbed when taking her family for a swim, the Eider-Duck covers their retreat by beating the water with her wings and so raising a screen of spray all around, while, by means of a peculiar sound, she urges her little ones to dive. If hard pressed, she will spring out of the water to attack the enemy; but a favourite device is to feign lameness, and so entice the intruder to follow her while her chicks make good their escape. This is a method which is practised by birds of many species, and we shall have to return to it later. Gulls are amongst the worst enemies of the Eider ducklings, and both Brehm and Audubon have noticed that two Ducks sometimes very prudently join forces for the more effectual guarding of their young, which are then seldom assailed.

As for the Gulls themselves, they make a terrible fuss when a man visits their nesting-colony; and their near relatives the strong, piratical Skuas, or 'Bonxies,' as they are called in the Shetlands, are in the habit, when *their* breeding-grounds are invaded, of swooping down upon the visitor's head from a height of about two hundred feet. As the birds get near their speed is terrific; just before reaching the intruder they drop their feet, and strike in passing, often knocking the cap off the

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head. According to Graba, bird-catchers sometimes hold knives above their caps, with the result that the impetuous birds occasionally impale themselves on the blade in their violent swoop. Both male and female join in the attack; the swoop is invariably made from behind, and directly after striking the bird rises gracefully on outstretched wings and wheels round to prepare for another attack. In the Antarctic the Skuas, when disturbed while guarding their fluffy little slate-coloured chicks, wheel round and swoop down in a similar manner, with wild cries; but Captain Scott says that he does not think any member of his party was ever actually struck, for at the last moment the birds used to turn aside. They often passed so near, however, that the men were brushed by their wings; and their tactics were decidedly alarming, for the Skua is a big heavy bird with a large ugly bill, and quite able, if it were just a little more courageous, to give a lot of trouble.

The Tropic-Bird (*Phaethon*), or 'Boatswain' as sailors call it, adopts similar tactics towards man. Leguat, who named this bird *Straw-Tail* on account of the peculiar projecting middle feathers, says: "These Birds made a pleasant War upon us, or rather upon our Bonnets; they often came behind us, and caught 'em off our Heads before we were aware of it: this they did so frequently that we were forced to carry Sticks in our hands to defend our selves. We prevented them sometimes, when we discovered them by their shadow before us: we then struck them in the Moment they were about to strike us. We cou'd never find out of what use the Bonnets were to them, nor what they did with those they took from us"—from which we must evidently understand that, unlike the Bonxies, Leguat's Straw-Tails were not content with knocking off the sailors' bonnets, but carried them away. It is interesting to note that both Boatswain and Bonxie are thoroughgoing buccaneers, and we shall have something to say about their piratical habits in another chapter.

The Giant Petrel (*Ossifraga gigantea*), or 'Nelly' of sailors,

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has a more unpleasant way of repelling invaders. In the South Orkney Islands these birds, which are vultures in habit, form rookeries of about two hundred nests all within a small area, though not quite so close together as the nests in a Penguin rookery. Each nest consists of half a bushel of pebbles and measures two or three feet in diameter; on this heap of stones a pure white egg is deposited. In order to secure the egg, the bird has to be knocked off the nest, and it shows its resentment and does its best to protect its property by sitting down a yard or two away and ejecting the contents of its stomach at the intruder! The result is such that there is no doubt whatever that the old sealers were amply justified in giving to these birds the uncomplimentary name of 'Stinkers.'

A more sportsmanlike method of defence is adopted by the aristocracy of Antarctic avifauna, the Penguins.

(Dr. Wilson, who accompanied Captain Scott on his voyage "furthest south," and whose interesting observations have added so greatly to our knowledge of the natural history of the Antarctic, writes concerning that comical creature the Adélie Penguin: "It would require a cinematograph to do justice to the peculiarities of the Penguin. . . . When annoyed in any way, the cock bird ranges up in front of his wife, his eyes flashing anger, his feathers erect in a ruffle round his head, and his language unfit for publication. He stands there for a minute or two breathing out threatenings and slaughter till his rage overpowers him, and putting his head down he makes a dash at one's legs and hails blows upon them with his flippers like bullets from a machine gun."

Enough instances have now been given to show that many birds, both great and small, will offer plucky resistance to an intruder whom they suspect of harbouring unfriendly intentions towards their family; but there is another kind of defence which is of peculiar interest, and which we must consider in the next chapter.

CHAPTER VI

MAKE-BELIEVE: A STUDY IN INSTINCT

Deceptive behaviour—The 'little brown bird'—Death-feigning—Lapwings and egg-gatherers—Wiles of the male bird and protective colouration of the eggs—Avosets and Stilts—Ducks and Drakes—Ostrich—Unkingly conduct of a King Vulture—Some artful dodgers—A cat's hunting—The paralysing effect of fear and the advantage which hunters take of it—Difference between death-feigning and the immobility of protectively coloured birds—The real 'possum—The popular idea of a 'shamming' bird—A true fairy-tale—Natural selection.

IN describing the various ways in which birds protect their young we have hitherto hardly referred to the strangest and most interesting of them all, but this is really an advantage, because if we consider it by itself we are more likely to come a little nearer to understanding what is a very puzzling question. Every sportsman and every naturalist is aware that when certain birds feel that their nests or young are in danger they behave in a very curious manner, fluttering or limping over the ground as though they were badly wounded and had the greatest difficulty in making good their retreat. The result of this strange behaviour is that the enemy is often completely deceived by their actions and is lured on in pursuit, for it seems impossible that the bird can escape as it struggles wildly only a few yards ahead, apparently almost exhausted by its efforts. Time after time it is almost within reach, and to all appearance it cannot possibly elude capture much longer; but somehow it always manages to keep just out of reach until, seeming suddenly to recover, it flies rapidly away and the chase becomes hopeless. Many of the Game-birds are most skilful performers of this little comedy, but the same method is re-

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sorted to by a great variety of birds, from the little Warbler to the mighty Ostrich ; Lapwings, Plovers, Rails, Avosets, Ducks, Pigeons, Pipits, and Buntings are all adepts in the practice. It is difficult even for those who are aware of their habits not to be deceived, while dogs are easy dupes and never fail to be led away by the manœuvre. When the chase is over and the bird has flown, the pursuer is usually far away from the nest, and if there be young ones they have had ample time to scatter in all directions and find secure hiding-places where it is almost hopeless to try to find them.

Our common Partridge is one of the best known exponents of this curious trick. Its devotion to its eggs and young is familiar to all dwellers in the country, but no amount of familiarity can diminish the interest which is excited by its wonderful devices. The rapidity with which a brood of young Partridges will make good their retreat while the parents distract attention by their antics, and the completeness with which they disappear from sight, have frequently been described.

Sterland, in his book on the birds of Sherwood Forest, says : "I once came suddenly on a brood of young ones, who could not have been more than a day or two old ; they were accompanied by both old ones, and were busily feeding on an anthill in the midst of the moss and heather. On my unexpected appearance, the cock bird tumbled off on one side and the hen on the other, with well-feigned lameness. Out of curiosity I threw myself on the ground and tried to secure some of the young ones ; but, to my surprise, it was in vain. A few seconds before, there were ten or a dozen of them in a spot scarcely larger than my hat, but before I was down on my knees, they were dispersed in all directions amongst the surrounding heather, and I failed to capture one of them. I could not help admiring the instinct which prompted these tiny things to such instant and energetic action, for it could not have been acquired by imitation or experience."

Some birds carry the deception a step further and simulate

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death, but this heroic measure is more often resorted to as a means of self-protection than for the purpose of assisting in the escape of the young. That is what we should expect, because it is clearly a greater advantage to the brood if the enemy can be induced to leave the neighbourhood, and that can best be done by enticing him in the way we are now considering. Still, 'death-feigning,' as it is usually called, is sometimes practised by anxious parents, and Audubon observed it in the case of the American Woodcock (*Scolopax minor*), who "regardless of her own danger . . . lay herself down in the middle of a road as if she were dead, while her little ones, five in number, were endeavouring on feeble legs to escape from a pack of naughty boys." We are not told whether the five young Woodcocks got away from their tormentors, but no doubt the weaker side found a good friend in the kindly naturalist. Few of us, however, have an opportunity of witnessing quite such a stirring drama in bird-life; yet the everyday incidents are hardly less interesting, and some of the most familiar birds are always ready to 'play the game' at the proper season of the year.

Wherever there are broad, barren pastures, ploughed fields, or moorland—almost anywhere, in fact, if only the ground be open enough—we may hear the wild, wailing cry and see the graceful flight of that most beautiful and picturesque of our common birds—the Lapwing, or Pewit. Perhaps there is no bird of blameless life—from our point of view—which is so greatly persecuted as this. Its handsome livery, which at a distance appears to be of black and white in about equal proportions, but the dark parts of which are really a beautiful green gleaming with purple and enlivened with bronzed reflections, makes it an easy mark for the gun; while its eggs—commonly known as 'Plovers' eggs'—are taken by thousands to be sold for the table. Not that all the so-called Plovers' eggs of the market are really what they pretend to be: many of them are those of the Black-headed Gull, or of some of the

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Terns, which are rather like Lapwings' eggs in appearance, and can hardly be distinguished from them in flavour except by people with a very delicate sense of taste. It is commonly believed that Rooks also contribute to the supply of 'Plovers' eggs,' but that is an absurd notion, for there is not the slightest resemblance between the shells of the two kinds, and it would be impossible to mistake one for the other.

Most of the eggs sold as Plovers', however, are those of the Pewit, and the birds' domestic arrangements suffer in consequence very severely at the hands of man. There is no doubt that they would be still more interfered with if the male bird were not so skilled in the art of deception during the nesting season. Probably most schoolboys are aware how difficult it is for a novice to discover a Pewit's nest in a large field. Here and there a bird is seen flapping in easy, irregular curves over the ground, uttering its unmistakable cry, and you watch carefully to ascertain in which spot its interest is centred: then you walk towards it. As you approach, the plaintive notes become more frequent, and the bird seems to be more and more distressed; it screams and complains, and falters in its flight; it dashes and tumbles frantically hither and thither, and you feel quite sure that the nest is within a few yards of you. But no—you decide that you were mistaken: you had misjudged the distance, and the nest must certainly be a little further on, for there is the bird in greater distress than ever; and surely it has hurt its wing? Why, it can hardly fly—see how it is tumbling over the ground! Ah, you nearly overtook it then, it only *just* managed to dash away! But the effort has exhausted it, and now it can scarcely control its movements in its desperate efforts to escape. Away over the ground it plunges and the pursuit becomes more exciting until—why, what is this? The bird has recovered and is flying easily—forty—fifty—a hundred yards away! Tired and breathless, you turn again to look for the nest, only to realise that, so far as you can remember, it was somewhere over there, on the

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other side of the field, that you first noticed the bird. So you walk across, and to and fro, and look on this side and on that; but one bit of ground seems just as likely as another and no nest is visible anywhere: perhaps you were wrong after all, and the birds have no nest in that particular field.

Now that, or something like that, is what occurs when a novice turns aside from his path to look for Plovers' eggs; but let us watch a man who had had experience in collecting them for the market. He looks over the field and sees birds wheeling about, flashing black and white in the early sunlight, and he hears their complaining; but he does not heed them. His attention is directed to those other birds that rise silently and unobtrusively as he approaches, and he carefully notes the spot which each one leaves. He does not regard the frantic behaviour of the cock, but walks straight to the spot from which the hen has risen, looks narrowly around, and then, a few yards away, something attracts his attention.

Let us suppose we are by his side; very probably we see nothing at all except the rough ground and here and there, perhaps, a few scattered stones. But the egg-gatherer steps forward and stoops down; and *then* suddenly we see the nest and its precious contents, and we understand why we did not perceive it before. For the nest is nothing more than a slight hollow in the ground with perhaps a few bits of dry grass or other vegetation around its margin, and the four black-spotted olive eggs, lying with the pointed ends all together (in which position they occupy least space and are most easily covered by the sitting bird), are scarcely to be distinguished from their surroundings, unless one happens to be looking directly at them. So although the Lapwing entrusts its treasure to the bare, open ground, and although its plumage is so conspicuous, it is seldom that the nest is seen, except by the trained eye, owing to the 'protective colouration' of the eggs and, what we are now particularly concerned with, the wiles of the male bird in leading the intruder astray. Only the superior cunning of the pro-



LAPWING LEAVING ITS NEST

When alarmed by the approach of an intruder the lapwing tries to divert attention from its eggs by dashing and tumbling about wildly, like a wounded bird, and is often successful in luring the enemy away from its treasures,

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fessional collector enables him to walk straight up to one nest after another, and even to judge, from the behaviour of the hen, whether he will find the full number of eggs and whether the bird has begun to sit.

Other members of the same great group as the Woodcock and the Lapwing have their own peculiar methods of counterfeiting lameness. We will mention but two—those strange and interesting birds the Avoset and the Stilt. The Avoset (*Recurvirostra avocetta*) is a bird about as big as a Lapwing and is remarkable for possessing, in proportion to its size, one of the most slender of bills, which is curved like a cobbler's awl, with the point turned upwards. Of old time these birds were plentiful in certain parts of England, such as Romney Marsh and the fen district. In Norfolk and Suffolk people made puddings of their eggs, and their feathers were used for tying artificial flies for fishing. But though they still visit us occasionally they have long ceased to dwell with us, and none has been known to breed in this country for almost half a century. We learn, however, from the accounts of older naturalists, that when the female was frightened off her nest it was *she* who counterfeited lameness; and before passing on to the Stilt we may mention that it is likewise the hen who adopts this method of defence in the case of the pretty little American Ground-Dove, in the Southern States. Dr. Ralph says: "When one is driven from a nest containing eggs it will drop to the ground as if shot, and will then flutter around as if wounded, to try to draw the person disturbing it away from the nest, but, whether it succeeds or not, it will soon fly off." This little bird is more interesting in its ways than the majority of the Pigeons, which are not usually very entertaining, for when there are young in the nest it is very determined in its efforts, fluttering and tumbling and dashing around in the wildest manner until it appears wellnigh exhausted by the violence of its antics.

The Stilt (*Himantopus candidus*) is a much smaller bird than the Avoset, being in fact no larger than a Snipe, but it has extra-

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ordinarily long legs—longer, in proportion, than those of any other species, not even excepting the Flamingo; on this account it is sometimes called the ‘Longshanks,’ or Long-legged Plover. Its home is on the muddy margin of pools and lakes, but it is only an occasional visitor to Great Britain.

When the hen-birds are sitting their partners roam over the marshes or wade in the pools, hunting for food about the surface of the water, but as soon as anybody approaches they all flock together and fly around, with their long legs trailing out behind, keeping up a continual yelping cry. Wilson says: “As they frequently alight on the bare marsh, they drop their wings, stand with their legs half bent, and trembling, as if unable to sustain the burden of their bodies. In this ridiculous posture they will sometimes stand for several minutes, uttering a curring sound, while from the corresponding quiverings of their wings and long legs, they seem to balance themselves with great difficulty. This singular manœuvre is, no doubt, intended to induce a belief that they may be easily caught, and so turn the attention of the person from the pursuit of their nests and young to themselves.”

Amongst the Ducks the seeming lameness takes yet another form, as we should expect from their different build. If the fine, handsome, sturdy Sheld-ducks are disturbed when taking their young family to the water for a swim, they trail and limp along the ground as though they had all their lives suffered severely from rheumatism and could hardly put one foot before the other; then, when they have succeeded in their object of warding off the danger from their little ones, they hurriedly return to them and fuss over them like the devoted parents that they are.

A more familiar bird than the Sheld-duck in England is the ordinary Wild Duck. In his delightful book on *Wild England of To-day*, Mr. Cornish describes how a pair of Wild Drakes were flushed from a shallow ditch near the lake in Richmond Park. “Almost at the same moment a lame duck shuffled

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distressfully from the same spot, and moved off slowly, with apparent difficulty, in a direction parallel to the lake. The counterfeit was so remarkable, that had we not caught a glimpse of a small black object dashing into the marsh which lay a few feet from the drain on the opposite side to the course taken by the duck, no suspicion as to the reality of her disablement would have occurred. Meanwhile, the old bird invited pursuit, lying down, as if unable to move further; and, resolved to see the end of so finished and courageous a piece of acting, we accepted the invitation and gave chase. For twenty yards or more the bird shuffled and stumbled through the rhododendron bushes, until she made for the lake-side, where the ground was more open. There, running fast, with her head up and discarding all pretence of lameness, for another twenty yards, she took wing, and flew slowly just before us, at about three feet from the ground, until she reached the limit of the enclosure, when, uttering a derisive quack, she rose quickly above the trees and flew out over the lake.

“Anxious to see the sequel to this beautiful instance of maternal affection, we hurried back to the little marsh where the ducklings were probably hidden, and, sheltered under a rhododendron bush, awaited the return of the . . . wild duck to her brood. In a few minutes she reappeared, flying swiftly in circles among the trees, and after satisfying herself that the danger was past, she alighted among some wild-currant bushes about thirty yards from the marsh. There she stood for a moment, still and listening, with head erect; and, seeing nothing to alarm her, ran bustling down to the drain. After realising that no harm had overtaken her brood on the spot where they had been surprised, she climbed the bank and tripped lightly into the marsh, where, in answer to her low quack, we soon heard the piping voices of the ducklings, which till then had remained motionless and invisible in the few yards of grass and rushes near. In a few seconds the whole

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family were united, and we had the pleasure of seeing the old bird swim past at the head of an active fleet of eleven black-and-yellow ducklings, making for the centre of the marsh."

All these birds are habitually self-sacrificing—or at least appear to place themselves in considerable danger—for the sake of their young; but we occasionally find instances of similar conduct in species that are as a rule by no means so exemplary in their devotion. The Ostrich is one of these; when surprised by man in the company of its young, the parent Ostrich usually scuds off as fast as he can over the desert and leaves the chicks to shift for themselves.

On one occasion, however, Mr. Anderson and Mr. Galton came upon a pair of Ostriches which showed more affection for their young. As these gentlemen approached, the whole family took to flight in company, the mother leading, followed by her chicks, and the cock-bird bringing up the rear some distance away. The chicks were unable to cover the ground very quickly and the male soon discovered that they were being beaten in the race, so he deliberately slackened his pace and turned aside a little. The hunters, however, refused to be led away, so he increased his speed and with drooping wings began to rush at a tremendous pace round and round the pursuers, gradually decreasing his circle and coming nearer to them until he was within pistol-shot, when he suddenly dropped to the ground and seemed to be making desperate efforts to regain his feet. A shot had already been fired at him, and Mr. Anderson hurried towards him in the belief that he was disabled. In that opinion he was mistaken, however, for as soon as it appeared wise to retreat the bird rose to his feet and began to scud away in the opposite direction, while his family, who had in the meantime put a wide space between themselves and their pursuers, continued on their course uninjured.

We have given enough examples of the strange instinct which leads birds of many species to behave as if they were wounded or otherwise disabled, with the result that their enemies

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are often lured away from the nest or young, which thus escape destruction: we have described the tumbling flight of the Partridge, the antics and distressed cries of the male Lapwing, the similar conduct of the hen Avoset; we have spoken of the attitudinising of the Stilt, the hobbling run of the Sheld-duck, the tactics of a Wild Duck, the frantic action of the American Ground-Dove, and the curious strategy of a male Ostrich; we have mentioned also how an American Woodcock went even further than any of these, and lay in the road as if dead, when its brood was in danger. It will be interesting now to consider how the death-feigning instinct serves birds for self-defence, and to try to understand the meaning of it all, if we can.

I remember seeing, many years ago, a young King Vulture which had recently arrived at the 'Zoo' from South America. He was a well-grown youngster, about as large as a Goose, but he was very shy and behaved in a most unkingly way in the presence of strangers, when he was being watched, for he used to crouch down, lay his head upon the ground, and remain quite still, like a dead bird. The North American Screech-Owl (*Scops asio*) of the Rocky Mountains also practises this deception. When the female is removed from her nest, she sometimes moans, snaps her bill, and shows fight; frequently, however, she does none of these things, but lies back perfectly motionless in the open hand with her eyes shut, to all appearance dead. If she be thrown up into the air while in this condition, she rights herself at once on the wing and alights on a neighbouring bough, where she stands crouching forward, with her ear-tufts turned back in a way that is suggestive of a bad-tempered horse, looking very spiteful and wicked.

We need not, however, go abroad for instances of death-feigning, for it is practised by a bird which is one of the commonest British species, although, owing to its stealthy habits, most people have never seen it. We refer to the Land-

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Rail or Corncrake (*Crex pratensis*), whose curious, double, creaking cry, uttered as it skulks amongst the meadow grass, may be heard incessantly during the spring at almost all times of the day and night. Canon Atkinson has given an amusing account of the behaviour of this bird when captured, which we will quote. He says: "A gentleman's dog catches a land-rail and brings it to his master, unhurt, of course, as is the well-trained dog's way, but to all appearance perfectly dead. The dog lays the bird down at his master's feet, and he turns it over with his toe. It simply moves as it is moved, all its limbs limp. Continuing to regard it, however, the man sees an eye opened, and he takes it up. The 'artful dodger' is quite dead again in a moment, head hanging and dangling, limbs loose, and no sign of life anywhere. It is put in its captor's pocket, and, not liking the confinement, begins to struggle. When taken out, it is just as lifeless as before; but being put down on the ground and left undisturbed—the gentleman having stepped to one side, but continuing to watch—it lifts its head in a minute or so, and, seeing all apparently serene, it starts up on a sudden and 'cuts its lucky' with singular speed."

Now, is the bird really an "artful dodger," or is it so timid that it is terrified into insensibility—a second and perhaps a third time—as soon as it discovers on opening an eye that its enemy is still there? That is a question which we are not yet in a position to answer. The marsh-dwelling Water-Rail (*Rallus aquaticus*), also a skulker, can 'play 'possum' just as successfully, and Canon Atkinson's account goes on to say: "In the case of the water-rail, which came under my own observation, it was picked up on a snowy day by the most intimate of the friends of my youth and early manhood. He assumed that it was dazed with cold, and perhaps what we Yorkshire folks call 'hungered' as well. So he brought it home with him, and laid it on a footstool in front of the dining-room fire. Five minutes passed—ten were gone—and still the lifeless bird lay as it was put down,

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dead to all seeming; only not stiff, as it ought to have been, if dead of cold as well as hunger. A few minutes later, my friend, who was very still, but yet with an eye to the bird, saw it—not lift its head, like the land-rail, and take a view, but—start off in a moment with no previous intimation of its purpose, and begin to career about the room with incredible rapidity. It never attempted to fly. Any other captive bird in its position would have made for the window at once, and beaten itself half to pieces against the glass. Not so the rail. With it, in its helter-skelter and most erratic course, it was anywhere rather than the window or the fire. Round the room, across the room, under the sofa, under the table, from corner to corner, steering itself perfectly, notwithstanding legs of chairs, legs of tables, the sofa-feet, footstools, or what not, on and on it careered; and it was not without some patience and many attempts that it was eventually secured.”

Such a sudden change from death-like stillness to frenzied activity is what we should expect in an animal recovering from a swoon and finding itself in an alarming situation from which its sole desire is to escape at all costs, rather than the behaviour of a good actor bent on hoodwinking his audience until he sees a favourable opportunity of slipping away unobserved. Perhaps the bird was frightened out of its senses when first surprised in a weak condition brought on by hunger and cold, but was not so easily overcome by fright when its circulation had been restored in front of the warm fire, and had then sufficient presence of mind to take to its heels (it would be more correct to say, take to its *toes* in the case of a bird) and try to get away.

The question is, can a bird be so terrified as to be paralysed by fear? I think it can. From my college rooms I used to have many opportunities of watching a fine black tom-cat hunting Sparrows. Tom's favourite method was to lie concealed under a laurel bush beside the lawn and wait patiently until a Sparrow alighted within reach, and then to make a spring.

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He was seldom successful, for he was getting old and, though still a fine figure of a cat, was rather stout and not so agile as a younger animal. But he never seemed to tire of his hunting, and in this he sometimes reminded me of those patient anglers who are quite content to sit the livelong day beside a stream whether they catch anything or nothing. But to return to our story: occasionally a Sparrow would hop about in a tantalising way just a little too far off for the hunter to risk a spring; he would then creep out from his hiding-place very stealthily in the hope of getting nearer unobserved. Very often, however, the Sparrow would catch sight of him before he was close enough to pounce upon it, and then I noticed that the bird was usually too terrified to fly away immediately—or at all events did not fly at once, as it no doubt would have done had it been able. Frequently there was quite a long pause before its little body sank close to the ground for the spring which helps the wings at the beginning of flight; and Tom, in spite of his years, was often the first to jump.

There can be little doubt that this momentary overwhelming sense of terror in birds, when they first catch sight of their deadly enemy at close quarters, gives the cat a great advantage in its hunting and enormously increases the number of victims. The so-called ‘fascination’ exercised by snakes over their prey is due to a similar cause; and certain other birds besides the Land-Rail and Water-Rail are affected in the same way by man. The fine Pileated Woodpecker (*Picus pileatus*), commonly known in North America, which is its native country, as the Logcock, is paralysed with fright if a man approaches unheard and makes suddenly as though to catch it. Not infrequently it falls to the ground as if dead without being touched, but when left to itself it quickly recovers and flies off with the utmost speed. On the pampas of the Argentine, in the Southern continent, Mr. Hudson tells us that the gauchos often capture the Black-necked Swan (*Cygnus nigricollis*) by frightening it. This is a large, handsome bird with a pure

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white body, a black neck, and a bright red knob on its 'nose.' When a flock of them are feeding or resting on the grass, the gauchos approach them quietly on horseback, taking care not to get on the windward side of them, and then suddenly wheel towards them and gallop at full speed, shouting at the top of their voices. The birds are so terrified that they cannot move, and fall easy victims. The gaucho boys also catch another bird, the Silver-bill (*Lichenops perspicillata*), by flinging a stick or a stone at it and then rushing in while it sits absolutely motionless, disabled by fear. In these cases it would seem almost possible to catch the birds by the method so often recommended to children by their elders—by putting a pinch of salt on their tail!

There are other birds which appear not to feign death—if we are still to speak of it as feigning—until they are actually caught. It certainly is not always a sham, whatever we may think about it as a rule, for captured birds sometimes die outright, being, in fact, literally frightened to death; while others drop down dead if they are only chased. Amongst the latter, according to Mr. Hudson, is the Spotted Tinamou, which is also ridden down by gaucho boys. The Tinamous are peculiar birds whose home is in South America, where they are often spoken of as 'partridges,' which they at first sight resemble, though their small head, slender neck, and long bill give them a very distinctive appearance. Darwin was struck by their silliness in allowing themselves to be taken, and in truth they have but poor brains and are lacking in intelligence almost as much as in courage. Now it is not to be supposed that such a foolish bird as this could intentionally play a part with much success, yet we learn that when captured, after a few violent struggles to escape, it drops its head, gasps two or three times, and to all appearances dies, but the very moment it is released, the eyes open wide, there is a rattle of wings, and the bird has flown!

We know that many birds, such as those which inhabit the

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desert where there is no cover in which they can take refuge, and young birds of numerous kinds, endeavour to avoid capture, when they are alarmed, by crouching down close to the ground and keeping perfectly still, their colour harmonising so perfectly with their surroundings that it is extremely difficult to detect them even at close quarters. But this habit is not to be confounded with death-feigning, for the moment such birds perceive that they have been discovered they take to flight or run away with the utmost speed.

Death-feigning is not confined to birds; we find the same thing amongst mammals, and though this is not the place to speak of them at great length, we may mention as examples the opossum, and a South American fox which lies so still when it is overtaken that it may even be lashed with a whip without showing the slightest sign of life. When we consider all these different cases, it is difficult not to believe that the animal is *not* consciously shamming, but is really for the time being quite insensible and does not know what is taking place, though it may recover suddenly and make a desperate effort to escape.

But what are we to think of those other cases of apparent shamming in which the birds seem to be wounded when their nests or young are in danger? Are they intentionally acting, or do they behave so strangely because they *must*, under the influence of an overpowering instinct? Let us see what it would mean if the bird were knowingly and intelligently playing a part. It would indicate that the bird, which might never have seen a wounded comrade, knew exactly how a wound would affect its movements; it would mean that it knew what effect its behaviour would have upon an enemy; it would mean that it was a most accomplished actor. But that is not all, for we should have to suppose that the bird—often of a species by no means remarkable for its intelligence—could reason with itself somewhat after this fashion: “Hello! here comes a dog, and there are all my little ones playing about! He’ll catch

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them, sure as faith! I had better try to attract his attention and get him out of the way while they hide; if I pretend to be wounded he will run after me, and then they will have time to get away. I must be careful, though, that he doesn't *really* catch me; but I must not move too quickly, or else he won't follow!" Would it not be a very clever bird indeed to think of all that in a moment, and then carry out the plan with skill that a first-rate actor might envy?

No, I think we must give up the idea that any bird is capable of such a deep-laid scheme; it would be a little more than the most cunning of them could devise. But in that case, what is the explanation? Probably it is something like this. Once upon a time, as they say in the fairy-tales—and 'once upon a time' is very long ago in the true fairy-tale of science—when birds began to be very fond of their homes and children, they were so much distressed when they saw their beloved possessions in danger that, although they were dreadfully frightened too, they could not fly straight away, but dashed hither and thither, hardly knowing what they were doing. The enemy, attracted by their strange movements, naturally started off in pursuit, and so the eggs or the little ones escaped.

Now in many things the children and grandchildren and great-grandchildren, and so on, through ever so many generations of animals, behave like their parents; we all know how a dog turns round and round before lying down, because its wild ancestors a thousand generations back had the same trick and turned round thus to make a nice snug bed in the long grass. So with our birds: the chicks of the parent bird who behaved so strangely through anxiety for their welfare would probably themselves act in a similar manner when it was their turn to bring up a family, and so *their* chicks would escape and grow up to carry on the trick; while the chicks of those individuals which just flew straight away would be caught and killed and so never grow up at all, or have any little ones of their own.

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The birds which tumbled about just enough, so that they both escaped themselves and warded off the danger from their chicks, would be the ones to rear successfully the most families and so perpetuate the race, and in that way the instinct would gradually be perfected. Here we have an instance of what, following the teaching of that great naturalist Charles Darwin, we speak of as 'Natural Selection.'

CHAPTER VII

SPORT AND PLAY

The meaning and importance of play—Fighting games—Playful pecking of tame birds—Nursing and nest-building play—Flying games—Swimming games—‘Follow-my-leader’—Hide-and-seek of climbing birds—Swinging—Birds and children—Toys and playthings—Mischief and destructiveness—Practical jokes.

IT has been said that animals do not play because they are young, but that they have their youth because they must play; and it is hardly too much to say that their success in life depends to a great extent on their success in play at this time, for their actions in play are nearly always of a kind not very different from the actions they will have to perform in real earnest later on. In play the animal either is not serious in what it does, or it tries to do things which there is no necessity for it to do at the time, but which, sooner or later, it will have to know how to do unless it is to fare very badly in life. Play forms a most important part of a young animal's education and of an older animal's business training, and if I were asked to say in as few words as possible exactly what animal play is, I think I should describe it as the exercise of instinctive activities just for fun.

The desire to play is itself an instinct, and as it is found in nearly all the higher animals we may be sure that it is a valuable one. It is worth while to consider rather more fully in what way it is so important. Play enables an animal to practise the exercises and actions which are necessary for its existence; in play it gains control and mastery over its body; it learns to move about skilfully—to fly, walk, leap, hop, run, or swim; it

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becomes agile in hunting its prey, deft in seizing it, strong in holding it ; it learns the knack of shaking and disabling it ; it learns to lie in wait, to hide, to dodge when running or flying ; and it learns to fight and to defend itself. Many of the things it is able to do when grown up, but which it does not know how to do instinctively, it first learns in play.

We must not forget, however, that there are other ways in which animals learn to do things, and one of them is by imitation. All the higher animals have a tendency to imitate the actions of their fellows, and in that way they learn to do a great many things which are themselves by no means playful ; but having learnt them by imitation, they often practise them afterwards in play. Young animals, like children, take pleasure in pretending ; like children, too, they are full of curiosity, and a desire to 'find out all about it.' They enjoy energetic action ; they enjoy making things move ; they enjoy doing things which they 'don't have to,' just for the pleasure of doing them.

Fighting games are the favourite form of play amongst many young animals ; it is hardly necessary to mention puppies as an example. In the same way, young birds often indulge in mock battles which sometimes become very realistic, especially as the birds grow older. Young Sparrows peck one another vigorously when they have nothing whatever to quarrel about, so far as we can see, and this habit never leaves them. We regard Sparrows as quarrelsome birds, and so they are, but there is little doubt that many of their 'shindies' are without serious foundation or intent. A Sparrow in high spirits chirps aggressively, another Sparrow answers back ; then there is a flutter of wings, and all the Sparrows in the neighbourhood hurry to the spot and join in, just for the fun of the thing. A general free fight ensues, with much abusive language and mutual buffeting, but as none of the combatants has any particular grievance against any other the squabble lasts only a few seconds, and then, having given vent to their superabundant

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high spirits and energy, the birds disperse as suddenly as a little crowd of street urchins at the cry of "Policeman!"

Other Finches also know the fascination of a friendly encounter, but few of them are quite so ready to improvise riotous assemblies as the hooligan Sparrows. Starlings are almost equally quarrelsome, and Wagtails bite and chase one another as enthusiastically as puppies. Young Game-birds thoroughly enjoy a 'scrap,' and it is by no means an uncommon thing to see two youthful Partridges with their wings spread and heads down indulging in a scrimmage.

A favourite amusement of many tame birds is to bite playfully at their master's fingers. If you have ever been on friendly terms with a pet Canary, you are probably familiar with this form of play. A brother of Brehm, the naturalist, had a tame Vulture which used to amuse itself by nibbling his fingers without hurting them, just as a friendly terrier will pretend to bite his owner's hand in play. The mock anger of a tame Bullfinch is very realistic; the bird gapes, hisses, flutters his wings, and ruffles his feathers at his master exactly as he does before a combat with a rival, although the two are on the most friendly terms. A pretence of challenge and combat is the most usual form of animal play, and it is easy to realise how useful it is as a training for real warfare.

But though among wild creatures skill in self-defence, and in attack too, is often a matter of necessity, life is not *all* fighting. There are other, more peaceful, arts which are in their way just as important, and these often have their counterpart in play. Many young birds make themselves useful in the nursery and help to look after their little brothers and sisters. When Canaries have two broods in the season, the youngsters of the first family often feed the nestlings of the second brood. In the same way a family of young Swallows which had themselves not long outgrown the nest have been known to help their parents to feed their little brothers and sisters. Some young birds are even more enterprising, for Altum saw several young Killdees

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still in their first suit of feathers busy mothering a young Cuckoo.

Young Moorhens have another interesting habit. In many cases the parents have several broods in the same season, the hen beginning to lay again when the first hatch is about a fortnight old. The young of the first brood have therefore to turn out of the nest, but the cock-bird builds another nest for them to rest and sleep in, and immediately on the appearance of the second hatch they assist the old birds in feeding and brooding over them, and then in taking them out in little parties. But this nursery-play goes still further, for they make additional nests for them, like their own, beside the water. Another water-bird, the Dabchick, also indulges in nest-building play, but not quite of the same kind. The Dabchick's nest is a heap of floating weeds and rushes, and as time goes by it becomes more and more sodden and sinks deeper in the water, so that it would disappear altogether beneath the surface if more weeds were not heaped on the top of it. But like many other water-birds, Dabchicks constantly add fresh material to their nest, and as soon as the young are old enough to help in this they do so.

(Even old birds sometimes indulge in playful building—'fancy-work' to pass away the time. Whether the 'cock-nests' which are made by certain birds, such as Wrens, are constructed merely in play, or whether they all serve some useful purpose, we do not know. Weaver-birds (*Ploceus*) in captivity spend a great deal of time in the exercise of their craft, and if for any reason they cannot make their peculiar purse-like nests, they still weave, using every available bit of thread or straw to entwine in the bars of their cage, passing it in and out between the wires, knotting it, and weaving such an intricate tangle that it can only be removed by cutting. This is, perhaps, nothing more than the industry of enforced idleness, and it may be that in their wild state the birds are too busy with their serious building and all the family cares that follow to do any weaving for mere amusement.

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There are a few instances of birds, which were not in the condition commonly known as 'broody,' sitting on eggs that did not belong to them, apparently for nothing but their own amusement. When Mr. Bartlett was in tropical South America he saw a Curassow (*Nothocrax urumutum*) running about amongst the common Fowls in a Peruvian's house. Curassows are fine, handsome birds nearly as large as a Turkey; their home is in the forest, but they are often captured by the natives and kept as pets, becoming quite tame and even affectionate towards their owners.

The particular bird described by Mr. Bartlett was the tyrant of all the domestic animals about the house, and would bully the dogs themselves and drive them out of doors. What was especially interesting was that when one of the Hens began sitting, it drove her off the nest and took her place; but it soon wearied of the game, and one day it destroyed all the eggs, like a bad child who breaks his toys when he is tired of them. As we shall see in another chapter when speaking of Ravens and Magpies, other birds besides Mr. Bartlett's Curassow display a taste for mischievous amusements.

Many species of birds fly for pleasure and perform all kinds of strange antics while on the wing. The Parson-birds of New Zealand, so called on account of two white tufts hanging under their chin like the white bands which used to be worn by clergymen, mount high in the air on fine days in parties of six or more and amuse themselves in a sportive flight accompanied by quite a variety of clever tricks. Moving round in wide circles, they turn and twist, throw somersaults, and parachute down with wings and tail spread wide. Then they dash upwards again and, closing their wings, support themselves in the air for a few moments by rapid beats of the expanded tail; but they cannot maintain their position long in this manner, and soon they begin another parachute descent, with the wings closed. As they come near the ground, the wings are half opened, and they shoot forwards and away, and so on, until at

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last, as if on some preconcerted signal, they all suddenly dive towards the forest and disappear from sight.

Many different species of birds enliven their flight by turning somersaults, but the only kind with which most people are familiar is the Tumbler Pigeon. Like all other domestic Pigeons the Tumblers are descended from the Rock Dove, which does not tumble, and some people maintain that their performance is therefore not natural. But as Darwin pointed out, the birds could not have been *taught* to perform this trick, and the instinct must have appeared naturally in the first place, though it has been strengthened by the selection of the most skilful birds, probably for hundreds of years. The result is that in the present race of Tumblers there are some wonderful performers. Their usual method is to fly in a close flock to a great height, turning back-somersaults as they rise.

Some birds cannot rise a yard from the ground without turning over, and some spring only a few inches from the floor, turn a neat back-somersault, and alight on their feet. In India there has been for 250 years past a breed which tumble over and over on the ground after being shaken slightly, and do not stop until they either fall exhausted or are taken up and blown upon! This can hardly be regarded as play, for the birds seem to be quite unable to help themselves; they *must* tumble, whether they will or not. But the more ordinary Tumblers appear to have a certain amount of control over their performance, and to enjoy it. A bird that had strayed five miles from the cote and was driven home with stones did not tumble once all the way, but as soon as she came in sight of the cote she darted inside for her mate and the pair together celebrated her return by a grand round of tumbling. Some birds, of the kind known as 'Rollers,' roll over and over so rapidly as they fall through the air for twenty feet or so, that it is impossible to count their turns, and they look like a ball coming down.

Besides antics such as these, and the spirited sporting flight

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of the Parson-bird, the games indulged in by Cuckoos may appear rather tame, but they are more of the nature of what we usually understand by play. Late in the afternoon in May, where these birds are plentiful they resort to some familiar glade or patch of ground dotted over with bushes and join in a sort of 'general post' or 'follow-my-leader,' in which any bird among them is the leader of the moment and is pursued by a companion as she flies from bush to bush to join another bird. The next minute she in her turn may fly away, flitting gracefully across the open ground pursued by a comrade, and so on, restlessly, untiringly, with no apparent plan or order or intention beyond a wish to play or dally with one another in the spring sunshine. The game proceeds noisily with many cries of "*cuckoo!*" and half a dozen breathless variations of the call, sometimes not going beyond a single syllable, a soft "*kūk*," a sharp "*kūk*," sometimes broken up, as it were, into three, or repeated in various ways.

Snow-Buntings have a boisterous little game of their own, in which a whole flock join. When they are all on the wing, those in advance alight on the ground; the birds coming on behind pass close over and settle in front of them, and so on, until the last birds of the flock are just about to alight, when the first members of the party—which now form the rear ranks, all the others having flown over their heads—take wing again and fly over to the front, and the manœuvre is repeated by numbers of the birds in turn, so that the whole flock appears to be rolling along the ground. The game is played to an unceasing accompaniment of clear call-notes. On meeting with any obstacle or arriving at a place such as the edge of a cliff, which breaks up their party, they all fly off together to a distant spot and begin again.

In his account of the animals which he met with in the desolate Antarctic region, Dr. Wilson gives an amusing description of the playfulness of the Adélie Penguin. The quaint little bird darts about hither and thither in the icy waters like

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a fish, dashing to and fro beneath the ice floes, bobbing up from the water a hundred yards away with the suddenness of a Jack-in-the-box and leaping on to the ice in sheer play, apparently with no more serious purpose than to wag his tail and squawk a greeting to a comrade far away on the floe. Having accomplished his object, in he dives again and, guiding his course in some wonderful manner, comes up just where he wished.

In the open sea, the birds play a sort of game of follow-my-leader, shooting through the water, propelled by their queer little wings, as fast as fish, gambolling like dolphins, and popping up on the ice floe like rabbits. "Smart, comical, confiding little beasts, the most excellent company imaginable in such a desolate region as the Antarctic, they are like anything in the world but birds." Penguins have two very terrible enemies which pursue them under the water—the Killer Whale and, a little further north amongst the pack-ice, the fierce Sea-Leopard, a huge seal twelve feet in length. Against such creatures as these they are of course quite powerless to defend themselves, and their only means of safety, if one of these animals comes on the scene while they are fishing, is to seek refuge on the ice. There can be little doubt therefore that their follow-my-leader and Jack-in-the-box games serve a useful purpose as a training in agility, on which their life depends, both in obtaining their food and in escaping from their foes.

When climbing birds are alarmed they try to avoid detection by hiding behind a branch or tree-trunk, and they are nearly all very skilful dodgers. It is very difficult indeed to get a glimpse of a Woodpecker if he wants to keep out of sight; he runs round and round the trunk, clings to the bark with his sharp claws, and on whichever side you may be, he always contrives to be on the other. You will therefore not be surprised to learn that the Woodpecker's favourite game is hide-and-seek. These birds are much addicted to play, and

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often a whole family join in the game, dodging one another round the tree, lying close against the bark with half-opened wings until discovered, darting away, chasing one another, and behaving generally in the most lively and frivolous manner for five minutes at a time.

Other birds are very fond of swinging. We know that this is so in the case of cage-birds such as Parrots and Canaries, which take evident pleasure in swinging on a ring; in a state of nature, Tits and many of the Finches are often seen clinging to the end of a slender bough and swinging on it. I believe Rooks and Crows thoroughly enjoy, on a windy day, being swayed about on the topmost branches of tall trees—at all events if they do not they might easily find a more stable perch lower down. Mr. Hudson and Dr. Sclater describe how White-tailed Kites (*Elanus leucurus*) in the Argentine sport in the high winds. They are handsome birds with ruby-red eyes which contrast finely with the snow-white feathers of their plumage. Their flight is as buoyant as a gull's, and their wing-power is marvellous; like the Martin, they delight to soar in a gale of wind, rising and falling alternately, and will spend hours at a time in this sport. Now and then they seem entirely to abandon themselves to the fury of the gale and are whirled away like thistle-down until, suddenly asserting their power again, they shoot back in the teeth of the wind to their original position. For their most interesting game, however, they require a cluster of tall poplar trees, and the way it is played is as follows. Each bird chooses a separate tree and perches on the slender twigs at the very top, balancing itself there with outspread wings. Then, when the next strong gust comes, they let go; the tree tops, swaying about with the force of the gale, are swept from under them, and the birds remain poised almost motionless in the air until the twigs swing back again to their feet.

Crows and Jackdaws also have a boisterous little game of their own which is played with much zest on a windy day. It

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consists in one bird suddenly hustling another off the tree or tower where he is perched, and taking his place—just as boys when bathing often push each other from the river-bank into the water.

There is not only a great deal of similarity between the play of many animals and that of children, but in some cases a feeling of fellowship and cordial understanding is shown by the way in which animals and children join in each other's games. This is, of course, most often seen in the case of dogs, but occasionally tame birds have been known to show the same kind of playful friendship. Naumann speaks of a tame Stork whose favourite amusement was to join with children in a game of catch. It used to run after them in the street with outstretched wings and seize their jackets with its bill, and then run away again, looking round to see whether it was being followed. It would in turn allow itself to be caught by the wing, and then once more run after the children. Similarly Günzel relates how a tame Magpie at a school used to go out with the children at playtime and invite them to play by hopping about excitedly and snapping her bill. She preferred the boys, who loved to tease her and tried to catch hold of her tail, but she was too quick for them, for she hopped nimbly aside and dodged so skilfully that it was impossible to touch her, though at other times, when not playing this game, she was quite docile. That it really was a game, and one which she thoroughly enjoyed, was quite evident from the way in which she followed any boy who would play with her, and never seemed to tire of the sport.

Whether Magpies, Jackdaws, Ravens, and other birds look upon the glittering objects of all sorts, which they are so fond of collecting and hiding away, as playthings, it is difficult to say. One frosty morning at the 'Zoo,' Mr. Cornish found the Ravens busy hiding all the pieces of broken ice they could find, in holes round the edges of their aviary. In order to conceal a large fragment more effectually one of the birds pulled it from

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the cranny into which it had been poked and carefully rubbed it in sand till it was well covered with a coat of grit before pushing it back again. The same morning "the Gulls were particularly noisy, and playing at a new game with bits of ice, which they picked up from the broken edges of their ponds and let fall on the sound ice. They then scrambled and fought for the pieces as they slid on the slippery surface." One big Gull swallowed his new toy, "a large triangular piece, which stuck for some time in its throat, and evidently gave it much discomfort until the sharp edges melted."

Some birds undoubtedly do have playthings with which they amuse themselves for hours at a time. A Crane will often play ball with a pebble or a bit of earth, tossing it into the air and catching it, or trying to do so, as it falls. I have seen a tame Raven amusing himself with a piece of wood exactly as a dog does, carrying it about, laying it down as an invitation to his master to try to take it away from him, and just at the critical moment picking it up again and dodging.

Girtanner speaks of a Vulture which used to tug at its master's watch-chain and clothing, or pull straws from his hand, "chuckling with delight" meanwhile. Straw appears to have been this bird's favourite plaything and when it saw its master getting ready to plait a straw rope it always joined him at once and stood by until the rope was ready for it to bite and pick to pieces. The padding of its cage was stuffed with straw—a perfect treasure-house of playthings; when the bird discovered this it tore open the cover and proceeded to apply the contents to its own particular use.

Mischief and destructiveness are often near akin to play in birds as in boys. Rey, speaking of his Carolina Parrots, says that their favourite amusement was throwing their water-vessels out of the cage when they had finished drinking, and if the cups broke they gave evident signs of enjoyment.

Linden kept some Cockatoos which *would* turn over the food-trough in their cage. He fastened it to the bars with

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wire, he screwed it down, and tried all sorts of means to secure it, but the birds knew perfectly well how to unscrew it, and were never satisfied until they had got it loose again; sooner or later they always succeeded in their efforts.

Perhaps Cockatoos are without exception the most destructive of birds, for they will gnaw through planks two inches thick, and even through a thin sheet of iron. Some enterprising birds amongst them are such determined prison-breakers that they will do their best to penetrate a brick wall.

No doubt Dickens exaggerated a little, as was his way, in his story of a Raven that died young, but as in his other exaggerations, the foundation of what he says is true enough. He writes: "It may have been that he was too bright a genius to live long, or it may have been that he took some pernicious substance into his bill, and thence into his maw,—which is not improbable, seeing that he new-pointed the greater part of the garden-wall by digging out the mortar, broke countless squares of glass by scraping away the putty all round the frames, and tore up and swallowed, in splinters, the greater part of a wooden staircase of six steps and a landing."

The variety of Raven (*Corvus corax principalis*) which inhabits the most northerly part of the American continent is credited with being a particularly mischievous bird, and is said to take special pleasure in annoying and teasing dogs. A sleeping dog gives him a fine opportunity for a practical joke, and he delights to arouse the sleeper by dropping a stick or a stone upon him. Only the most highly developed animals and birds, such as Monkeys, Parrots, and Crows, are clever enough to invent jokes of this kind. The various members of the Crow family in America appear to be exceptionally resourceful in such tricks. The American Magpie sometimes imitates the cry of a Hawk and sends poultry running helter-skelter in every direction; on another occasion it will produce a sound so exactly like the cackle of a Hen after she has laid an egg that the rooster is completely deceived by it and hurries to the spot

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where his lady appears to be, in order to pay her a few courteous attentions, only to discover that it is *vox et præterea nihil*—she is nowhere to be seen. The Blue Jay (*Cyanocitta cristata*) is an even more gifted mimic, for he can imitate to perfection the call-notes, alarm-notes, and cries of distress of quite a number of birds and animals, and delights in doing it for his amusement. Owls he is especially fond of fooling, and sometimes he has the temerity to tease Hawks, which he may do in safety while he keeps to the cover of the woods, but in the open the Hawk sometimes gets his revenge, and the consequences for the Jay are serious.

According to Brehm, the gentle and respectable Ibis (one species of which was regarded as a sacred bird by the Egyptians and figures in their kingly cartouches), is not above occasional practical joking. He writes: "Those I have known lived fairly peacefully with all the other birds sharing their quarters, but domineered to some extent over the weaker ones and took apparent pleasure in teasing them. The Flamingoes were their especial butts, and they had a very curious method of teasing them. While they were asleep, the head buried amongst the feathers, an Ibis would quietly sneak up and peck at their webbed feet, from pure mischief, and not meaning to hurt them." The Flamingo, startled out of his nap by the tickling of his feet, would glance at his tormentor and move away to another spot, but he was not allowed to sleep in peace, for the Ibis was soon after him and indulging in the same pranks.

Numerous other examples of birds' mischievousness, destructiveness, and practical joking might be given, but though they are amusing, such tricks are not play in the true sense of the word, and we must pass them by in order to describe habits which are in many ways more interesting.

CHAPTER VIII

PLAYGROUNDS AND PAVILIONS

The Paradise-bird's playing-tree—Beauty on a pedestal—The Argus Pheasant's drawing-room—A wonderful courtship display—Sexual selection—The Polyplectron's playground and courtship—The club-grounds of Game-birds—Bower-birds and their pleasure-houses—Satin Bower-birds at the 'Zoo'—Decorating the bower—A *depôt* for lost property—Courtship-play—The Spotted Bower-bird's avenue and playthings—The Regent Bower-bird's love of colour—Carpeted playgrounds—The Gardener-birds and their beautiful pleasure-grounds—The Golden Bower-bird's toy village and triumphal arch.

TO speak of "Birds at Play" seems quite natural and reasonable, for play is what we should expect of creatures nearly all of which are so active and vivacious, and in many cases so intelligent. But when we come to talk of playgrounds and playhouses or pavilions it is quite another matter, for though it is well known that birds have their favourite localities and often remain in the same neighbourhood, and even within a very small area, for considerable periods of time, especially in the nesting season, we are apt to look upon them as wanderers who can, and do, range far and wide, flying where they will, with the world for their parish, and therefore not at all likely to claim one tiny spot upon the ground for their sporting like the less favoured beings who are bound to earth for want of wings. Nor do we expect to find them engaging in architectural pursuits other than the building of nests. Yet birds' playgrounds and playhouses do exist, and though they are by no means common they are not so rare as might be supposed, for a considerable number of species construct them.

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Short of an actual play-ground, the nearest approach to it is a favourite tree which the birds frequent for their social gatherings, and where they amuse themselves with strange antics. The Great Bird-of-Paradise (*Paradisea apoda*), for example, chooses a tall forest tree with an immense head of spreading branches and thin foliage which gives plenty of clear space for play. There a dozen or twenty full-plumaged male birds assemble in the early morning and display their beautiful plumes, raising their wings high over their backs, stretching out their necks, and keeping their rich golden side-feathers in continual vibration. They fly about from branch to branch in great excitement, so that the tree presents a kaleidoscopic scene of dancing colour; and so intent are the birds on play that they can be shot down one after another with arrows by a hunter concealed in a little shelter of palm leaves among the branches.

Many other birds of beautiful decoration have special playing-grounds, where they spend much of their time in attitudinising and displaying their charms. The most fantastically ornamental of them all are the Lyre-birds (*Menuræ*) of Australia. In some respects, as in colour and in the large size of its feet, a Lyre-bird is not much unlike a Megapode, but its wonderful tail is perhaps the most remarkable and peculiar decoration possessed by any bird. The two large, broad, strangely curved outer feathers, whose resemblance to the form of a lyre has given the bird its name, appear at first sight to be notched at intervals, almost from end to end, across the whole width of the inner web, but the seeming notches are really transparent patches of feather of an open texture. In addition to these remarkable feathers they have a number of light filamentous plumes like those of the Paradise-birds. It takes four years for the bird to put on his full livery, and then, alas! he does not retain it long, for the beautiful tail is soon moulted. But while he has it, he is naturally very proud of such a fine possession, and takes great care of it. Going

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through the brushwood of his native forests he carries it straight out in a line with the body so that it escapes being damaged by contact with the branches; but when he arrives at his playground he raises it on high and spreads it out to show its full beauty.

The playground is a small, round hillock, trampled smooth by the bird's powerful limbs, which are so muscular that he can make a standing jump of ten feet to the branch of a tree and then bound by similar leaps from branch to branch. On the top of this hillock he stands, constantly trampling, scratching, and pecking, while he gracefully droops his wings and moves his tail about to an accompaniment of song. Sometimes it is his own proper song, clear and musical, that he sings; at others it is that of any bird he takes it into his head to imitate, for he is one of the cleverest of bird-mimics. Speaking of the species known as Prince Albert's, Mr. Leicester says: "One of these birds had taken up its quarters within two hundred yards of a sawyer's hut, and he had made himself perfect in all the noises of the sawyer's homestead—the crowing of the cocks, the barking and howling of the dogs, and even the painful screeching of the sharpening or filing of the saw."

Another bird of princely splendour which makes a special playing-ground whereon to disport himself and exhibit the grandeur of his attire is the Argus-Pheasant (*Argusianus argus*). Though it has no gorgeous colours, after the Peacock this is perhaps the most splendidly decorated of all the large birds in existence. Like its namesake it is the possessor of 'a hundred eyes,' the whole of the outer web of its enormous secondary wing-feathers being decorated with circular spots, each of them rather larger than a halfpenny, of white and yellow, shading to a deeper rufous tint, and surrounded by a ring of black, the colour being so beautifully arranged and shaded that each spot or 'eye,' when held in a certain position, looks exactly like a ball resting in a cup. This Argus-Pheasant

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(there are two other species) inhabits the forests of the Malay Peninsula, Siam, southern Tenasserim, and Sumatra. In some parts of Tenasserim it is quite common, and if a gun be discharged in the forest numbers of the birds begin to utter their loud "*how-how*" note, which is audible fully a mile away. This is the male bird's call-note; the female has quite a different cry, which may be represented by "*how-owoo, how-owoo!*" with the last sound much prolonged, and when calling she repeats the sound more and more rapidly until it ends in a series of "*owooos*" all run together.

Except when she has made her nest, the hen-bird has no fixed abode, but wanders at large in the forest. The cock, on the other hand, chooses an open spot where the ground is level, sometimes in a dark and gloomy ravine shut in by dense cane-brake and rank undergrowth, at others on a hill-top where the vegetation is less dense, and there establishes what Mr. Davison, who knew more than any other writer about this bird, called a drawing-room. It is a very unpretentious drawing-room, and is made by simply clearing away all weeds and dead leaves from a space measuring about twenty feet from side to side, until nothing remains but the bare earth. Thenceforth all the bird's spare time is devoted to keeping his drawing-room tidy, and if he finds a dead leaf or a twig or any other kind of litter lying there he never fails to remove it at once.

The Malays are very well aware of this habit and turn it to account in their ingenious method of trapping the bird. They take a narrow splinter of bamboo about eighteen inches long and shave it down until it is as thin as paper and as sharp as a razor; then they fasten one end of it to a stout peg or handle. During one of the bird's expeditions in search of food they enter his drawing-room and drive the peg firmly into the ground. When he comes home again and sees an untidy-looking object rather like a giant grass-blade sticking up right in the middle of his drawing-room floor, the very first thing he does is to try to remove it. He takes hold of it with his

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beak and gives it a pull; the tiresome thing will not break off easily, as a weed should do, however, and after tugging at it for some time and trying to scratch it up, he begins to be annoyed. But he is determined to get rid of it somehow, so he gives it two or three turns round the neck in order to get a better hold, and taking the peg in his bill, springs backwards with all his might. The peg does not move, but the thin, tough bamboo-shaving tightens up, its sharp edges cut deeply into his neck, and he falls down with his head almost severed from his body.

Another way in which the Malays trap these birds is by erecting a sort of miniature football-goal in the middle of the 'drawing-room,' and slinging from it a heavy block of wood by a string which passes over the cross-bar and is fastened to a peg immediately under the block. In this form of trap the peg is driven into the ground quite lightly, so that the bird can pull it up without much difficulty. As soon as he does so the string is released and the log which hangs from the other end of it falls upon him and crushes him.

Without having recourse to such arts as these it would be extremely difficult to capture the beautiful Argus, for though he spends all the time he can in his clearing, and roosts in the nearest tree, he is an extremely shy bird. However stealthily a hunter may approach the spot where an Argus is quietly pacing to and fro in his drawing-room, uttering his peculiar call, when he gets near enough to peer through the dense surrounding foliage he is almost certain to find that the bird has deserted his clearing and dived into the thicket. We cannot therefore be quite sure how he passes all the time which is spent in his playground.

Mr. Davison thought that he probably dances there, but he never succeeded in catching one amusing himself in this way. It is very likely, however, that in answer to his loud calling he receives visits from the hens which, as we have already mentioned, wander about the forest, and that he entertains them by

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displaying to their admiring gaze his wonderful attire, just as he has been observed to do in captivity.

He begins by strutting to and fro in front of the hen in order to attract her attention, casting sidelong glances upon her and occasionally shaking his wings in a lively manner, so as to make her understand that he is in a playful mood and quite ready to entertain her if she will but take notice of what he is doing. Having sufficiently aroused her curiosity and prepared her for what is to follow, he halts close in front of her and—*trrrrrh*! with a rattle of quills and rustling of feathers he is suddenly transformed before her very eyes into a great circular screen with one edge on the ground, and in an almost upright position, like a picture on an easel. It may be compared to the sudden opening of a Japanese sunshade. Not a vestige of *bird* remains, for his body and limbs are completely hidden, and even his head is tucked away at the back of the outspread wings so that nothing shall obstruct the hen's view of the wonderful picture he has displayed for her admiration.

The open wings are overtopped by the enormously long tail-feathers, towering high above all the rest, and the shading of the eyes on each great wing-feather is so disposed that, with the light shining from above, every one of them looks exactly like a real ball lying in a real cup. At the same time the smaller wing-feathers, the *primaries*, are turned down in front of the breast near the ground like two little fans or shields, and as every one of these feathers appears to have a second smaller feather of chestnut dotted over with tiny white points painted upon it, the display is very wonderful indeed, and if the hen-bird does not admire all these exquisite patterns she must be very difficult to please. But since even his head is behind the screen, how is the possessor of so much finery to know whether she is pleased or not? By moving his head a little lower he would be able to peep under the edge of the wing and so watch the effect of his display. Some naturalists think that is what he does; but Mr. Bartlett saw the Argus at the 'Zoo' adopt

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another plan. He noticed that some of the secondary feathers were often rather frayed and worn near the base, and he was at a loss to account for this until he observed one of the birds, while showing off, suddenly pop his head *through* the screen, between two feathers, as though to inquire what he and the hen and the world in general thought of *that* for a show!

Some people declare that amongst birds the female really cares very little about the fine clothes of her wooers and is quite incapable of appreciating their beauty, being far more impressed by a bold and quarrelsome demeanour than by richness of attire. If that were so in all cases such a bird as the Argus would be in sorry plight, for his wonderful decoration and extraordinary attitudes during courtship would be purposeless and entirely wasted, and he seems to be wholly devoid of the fighting spirit. He will even allow himself to be flaunted in his own drawing-room and driven out of the clearing by a Pheasant of another species, rather than attempt to defend his domain, as the following incident, related by Mr. Davison, shows:—

“I had stalked an Argus, and while waiting to obtain a good shot, I heard the peculiar note, a sort of ‘*chukun, chukun*’ followed by the whirring noise made by the male Fireback,¹ and immediately after saw a fine male Fireback run into the open space, and begin to chase the Argus round and round its clearing. The Argus seemed loth to quit its own domain, and yet not willing to fight, but at last being hard pressed it ran into the jungle. The Fireback did not attempt to follow, but took up a position in the middle of the clearing and recommenced the whirring noise with his wings, evidently as a challenge, whereupon the Argus slowly returned, but the moment it got within the cleared space, the Fireback charged it, and drove it back into the jungle, and then, as before, took up his position in the middle of the space and repeated the challenge. The Argus immediately returned, but only to be again driven back, and this continued at least a dozen times, and how much longer

¹ The Fireback Pheasant of Tenasserim (*Lophura rufa*).

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it would have continued I cannot say, but a movement on my part attracting the birds' attention, they caught sight of me, and instantly, before I could fire, disappeared into the jungle. The Argus never made the slightest attempt to attack the Fireback, but retreated at once on the slightest movement of the latter towards it, nor did I see the Fireback strike the Argus with either bill, wings, or spurs."

I do not know whether the Polyplectron, a near relative of the Argus, is equally peaceable in its disposition, but this is hardly likely because the cock-bird has weapons on his legs, in the form of double spurs, which mark him out for a fighter, and look quite capable of making short work of an adversary. The Polyplectron is a splendid little Pheasant which inhabits almost the same region of the world as the Argus, but is rather scarce and local. In the island of Palawan, to the north of Borneo, Mr. Whitehead found it in only one forest. Like the Argus, it makes a clearing in some unfrequented spot and keeps it neatly swept. Right in the middle of the ring, which is much smaller than the Argus's drawing-room, there is often a hump of earth, where the bird no doubt stands, as on a pedestal, to show off his fine feathers; for though he is a much smaller bird than the Argus, he is hardly less wonderfully adorned, and is even more ingenious than that bird in striking attitudes when courting. His feathers are marked with brilliant eyes like those on a Peacock's train, but in his case the ornaments appear on the wings as well.

Now when a Peacock wants to be seen to the best advantage by his lady-love, he stands facing her, because he has to show her his beautiful blue throat and breast as well as his wonderful tail. But there is nothing very attractive about the Polyplectron's breast, which is rather dull and sombre than otherwise; so he turns it away, out of sight, while he raises and spreads his tail and twists it a little to one side, at the same time dropping the nearer wing and raising the opposite one. In this ingenious attitude he struts before the admiring female

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with every 'eye' he possesses turned towards her. If she walks over to the other side of him, he at once changes front, throwing up the opposite wing and giving his tail a twist so that she may still see only what is most beautiful in his plumage.

Both the Argus and the Polyplectron, then, make little private playgrounds where they spend their time either in solitude or with only one spectator to admire their antics; but many Game-birds have a sort of club-ground where they meet and sport in company, and that is, of course, in some ways far more interesting. Being Game-birds, however, they seem to be unable to play without quarrelling, and as there is a great deal to be told about their doings I think we had better reserve them until we come to consider the courtship of birds, when we shall have to speak about their dancing parties and tournaments.

We now come to one of the most remarkable circumstances in bird-life. In the Australian region, the home of the Mound-Builders (whose curious 'incubators' we have already described), and of the strangely adorned and interesting Lyre-birds, there dwells a family known as the *Ptilonorhynchidæ* or Bower-birds. There is nothing very extraordinary in the appearance of these birds, which are about the size of a Jackdaw (to which they are allied) and usually by no means bright in colour, though some of them have gaily coloured crests or particularly glossy plumage. Their claim to distinction lies in their astonishing habit of building arbours and playhouses, or pavilions, which are in some cases surrounded by elaborate pleasure-grounds, and are the most curious of the many strange examples of bird architecture. These arbours or bowers have nothing to do with the nests which the birds build, and which are of quite an ordinary kind, being not unlike that of our own Jay. On the contrary, they are designed and erected and laid out for amusement and play, and for nothing else. Every kind of Bower-bird has its own peculiar style of architecture; some of the bowers are quite simple in form and others are more

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elaborate, but they are all so strange that if you came across one and did not know that it had been made by a bird, I think you would be quite sure that you had at last discovered the real home of a fairy.

The species of Bower-bird which is best known in this country is the Satin Bower-bird (*Ptilonorhynchus violaceus*), whose name is derived from his beautiful glossy blue-black plumage, which shines like satin in the sunlight. He has, besides, large and lustrous eyes of azure blue, set in a circle of coral red, and is altogether a handsome bird in spite of his quiet colouring. The female is greenish in colour and by no means so glossy as her husband, though she of course shares his name. Both male and female may be seen in our Zoological Gardens, where you may often find them at play and watch the cock-bird building his bower.

The bower is built of slender twigs, arranged in the form of a very short avenue, open, of course, at both ends. Some of the twigs are curved and cross each other overhead, so that on looking through the bower you see that the top of the tunnel is pointed, like a Gothic arch. Only a few of the twigs meet in this way, however, so the roof is not really closed in, but is formed of a delicate open network or tracery. The ends of the twigs of which the sides of the bower are built are firmly interwoven into a platform of sticks which forms the floor. The male bird is the chief worker, though his partner sometimes helps him a little in his task.

When the building is finished, or perhaps even sooner, the birds turn their attention to the decoration, and in this they show a curious fancy. In the Gardens they use any bright-coloured objects which are supplied by their keeper, such as bits of wool, shreds of cloth, or scraps of paper, but in their native forests, where the bowers are found in remote spots under the shelter of overhanging branches, they collect gaudy Parrots' feathers and dead leaves for the adornment of their playing-ground. What they particularly fancy, however, are

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shells and the bleached bones of animals, which are sometimes found in great numbers at the entrance to the bower. In one bower, which was photographed by Mr. North, there were twelve pieces of wallabies' bones, three pieces of moss, a spray of acacia blossom, some eucalyptus cones, seven shells, and the egg-bag of a spider—as miscellaneous a collection of playthings as one would find in a small boy's pocket. The fact is, these Bower-birds are such inveterate collectors that they will appropriate almost any object of a suitable size that they come across, and this habit is so well known to the natives that when any small ornament or similar object is missing they make a point of going round first of all to all the bowers in the neighbourhood to look for it. Mr. Gould once found a stone tomahawk amongst the birds' treasures, and in another instance the edifice was decked with a variety of blue woollen scraps which had no doubt been stolen from some neighbouring settlement.

These objects are used as playthings as well as for the decoration of the bower, and even for the adornment of the male bird during courtship. There is very little doubt that all the playgrounds made by birds are in some way connected with courtship, though they are used for amusement as well. That is what we should expect if we are right in believing that animal play of all kinds is really preparation or practice for the more serious business of their lives, for what is more important to a bird than the winning of a mate? We therefore find that there is courtship play just as there is hunting or fighting play, or nest-building play, or flying games.

When the Bower-bird is wooing his lady he behaves in a very energetic manner. He chases her about, seizes a gay feather or a large leaf in his bill (no doubt to make himself more beautiful, just as a human wooer is sometimes known to put a flower in his buttonhole), utters a curious kind of note, ruffles his feathers, runs round the bower, and becomes so excited that his bright eyes seem almost to start out of his head. He opens

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first one wing and then the other, whistles, pretends to pick up something from the ground, and exercises every art which could possibly prove attractive to the lady of the bower, until at last she can no longer resist his allurements.

The Spotted Bower-bird (*Chlamydodera maculata*) is more ambitious in its architecture than the species which we have just described. Its arbour, like that of the Satin-bird, has the form of an avenue, but it is two or three feet long, and is built on a different principle. In the first place, instead of making a platform of sticks to support the walls, these birds, like ourselves, prefer underground foundations, and dig a trench on each side in which they plant the ends of their sticks, so as to form an arched walk. Then they line the walls with tall grasses so disposed that their heads nearly meet, and cleverly kept in their places by stones placed on the ends of the stems along the floor of the avenue. At each end the stones diverge from the entrance, so as to form a little path on either side. The Spotted Bower-birds are even more industrious collectors than the Satin-bird, for they accumulate as much as half a bushel of shells, stones, bones and skulls of small animals, and other objects, at each entrance to the bower. Mr. North discovered a bower in which the birds' originality and inventive genius had led them to construct a second arch over the middle of the first one by continuing the upward curve of the twigs, and the architects had added several Eley's cartridge-cases to their decorations.

The birds visit the deserted camp-fires of the natives in search of bones and other "unconsidered trifles," but the smooth, round pebbles and some of the shells can only be obtained from rivers and streams, or from the sea-shore, and as these are often at a considerable distance from the bowers—in some cases several miles away—a great deal of labour must be spent on the collection. Mr. Lumholtz¹ says: "There are frequently hundreds of shells, about three hundred in one heap

¹ *Among Cannibals.*

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and fifty in the other. There is also usually a handful of green berries partly inside and partly outside of the bower ; but like the empty shells and the other things collected, they are simply for amusement. . . . This bower-bird has another remarkable quality, in its wonderful power of imitating sounds. When it visits the farms, where it commits great depredations in the gardens, it soon learns to mew like a cat or to crow like a cock."

The shells are not regarded by the birds merely as ornaments ; they are true playthings, with which they amuse themselves for hours at a time. The Great Bower-bird, for instance, picks up a shell from one heap and, carrying it in its beak, runs through the archway and adds it to the pile at the opposite end. It then chooses another shell from the second heap and hurries back with it, and so on, taking a shell from each side alternately and flitting to and fro through the bower.

The handsome Regent Bower-bird (*Sericulus melinus*), whose bower is very much like that of the Satin-bird, gives evidence of much artistic taste, using berries of several kinds and colours, young shoots of a pinkish tint, and freshly gathered leaves, for the adornment of its playhouse. The ground beside the bower is swept clear of leaves, and here the male bird has been seen jumping about, puffing out his feathers, rolling over, and indulging in all sorts of queer antics. Two other species, *Scenopæus* and *Ailurædus*, build no bower at all, but prepare an elaborate playground by first making a clearing six or eight feet wide, and then spreading over it a beautiful green carpet of leaves and grasses. Mr. Lumholtz describes how, on one of his excursions amidst the dense scrub on a mountain-top, his attention was attracted by the loud and unceasing voice of a bird. On approaching the spot whence the sound proceeded he found a modest little grey bird, about the size of a thrush, the *Scenopæus denti-rostris*. The bird had been neatly arranging a number of large fresh leaves side by

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side on the black soil, and was singing happily over his work. As soon as the leaves fade they are replaced by new ones, so that the bird always has a nice bright carpet to play on. "On this excursion," Mr. Lumholtz writes, "I saw three such places of amusement, all near one another, and all had fresh leaves from the same kind of trees, while a large heap of dry, withered leaves was lying close by. It seems that the bird scrapes away the mould every time it changes the leaves, so as to have a dark background, against which the green leaves make a better appearance. Can any one doubt that this bird has the sense of beauty?"

"The bird was quite common. Later on I frequently found it on the summit of the Coast Mountains in the large scrubs, which it never abandons. The natives call it *gramma*—that is, the thief—because it steals the leaves which it uses to play with."

We have already seen that the taste of the several kinds of Bower-birds differs: one species collects the blue tail-feathers of Parrakeets, bleached bones, and shells; another has a fondness for smooth pebbles and tall grasses; some show a preference for large green leaves, and some for berries. But none show such a lively sense of the beautiful as the Gardener-birds, whose wonderful arbours and pleasure-grounds are perhaps the most marvellous examples of animal art. Mr. Wallace thought that there was no good reason for believing that birds take any delight in colour for its own sake; according to his view, a Bower-bird would only rejoice in bright berries because they are often good to eat. But the Spotted Bower-bird and the Regent-bird collect berries merely to play with, to carry about, and to arrange and rearrange amongst the twigs of the bower; and the case is even stronger in favour of the Gardener-birds, which gather not only berries, but bright orchids and other beautiful flowers, which they use in making for themselves lovely gardens with mossy lawns and the most delightful little summer-houses you could imagine.

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These fascinating birds live in New Guinea, where bright blossoms and brilliant berries are plentiful. We owe the earliest description of their fairy-like gardens to Dr. Beccari, an Italian naturalist. The species which he met with was the Gardener-bird known as *Amblyornis inornata*, and I think we had better let him tell us in his own words exactly what he saw, leaving out a little here and there because the account is rather long.

He says: "I had just killed a small new species of Marsupial which balanced itself on the stem of a great tree like a Squirrel; and turning round, I suddenly stood before a most remarkable specimen of the industry of an animal. It was a hut or bower close to a small meadow enamelled with flowers, on a diminutive scale. After well observing the whole, I gave strict orders to my hunters not to destroy the little building. That, however, was an unnecessary caution, since the Papuans take great care never to disturb these nests or bowers, even if they are in the way.

"While I was there, neither host nor hostess were at home, and I could not wait for them. My hunters saw them going in and out, when they watched their movements to shoot them. I could not ascertain whether this bower was occupied by one pair, or by several pairs of birds—whether the male alone was the builder, or whether the wife assisted in the construction. I believe, however, that such a bower lasts for several seasons.

"The *Amblyornis* selects a flat, even place around the trunk of a small tree, about as thick and as high as a medium-sized walking-stick. It begins by constructing at the base of the tree a kind of cone, chiefly of moss, of the size of a man's hand. The trunk of the tree becomes the central pillar, and the whole building is supported by it. On the top of the central pillar twigs are then methodically placed in a radiating manner resting on the ground, leaving an aperture for the entrance; thus is obtained a conical and very regular hut. When the work is

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complete many other branches are placed so as to make the whole quite firm and impermeable to wet. A circular gallery is left between the walls and the central cone, the whole bower being about three feet in diameter. All the stems used by the *Amblyornis* are the thin stems of an orchid forming large tufts on the mossy branches of great trees, easily bent like a straw, and generally about twenty inches long. The stalks had the leaves, which are small and straight, still fresh and living on them, which leads me to the conclusion that this plant was selected by the bird to prevent rotting and mould in the building, since it keeps alive for a long time.

“The refined sense of the bird is not satisfied with building a hut. It is wonderful to find that it has the same ideas as a man; that is to say, that what pleases the one gratifies the other. The passion for flowers and gardens is a sign of good taste and refinement. I discovered, however, that the inhabitants of Mount Arfak did not follow the example of the *Amblyornis*, for their houses were quite inaccessible from dirt.

“Now let me describe the garden of *Amblyornis*. Before the cottage there is a meadow of moss; this is brought to the spot and kept free from grass, stones, or anything which would offend the eye. On this green turf, flowers and fruit of bright colours are placed so as to form a pretty little garden. The greater part of the decoration is collected round the entrance to the arbour; and it would appear that the husband offers there his daily gifts to his wife. The objects are very various, but always of a vivid colour. There were some fruits like a small-sized apple; others were of a deep yellow colour in the interior. I saw also small rosy fruits, and beautiful rosy flowers of a splendid new *Vaccinium*. There were also fungi and mottled insects placed on the turf. As soon as the objects are faded, they are moved to the back of the hut.”

The first specimens of the Gardener-bird which were described were all either hens or immature males, which are dull and ‘unadorned,’ as the Latin name implies. It was not until

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twenty years afterwards, quite recently, when the adult male was discovered, that he was found to possess an enormous crest of brilliant orange; he is still called by naturalists *inornata*, however, though his baptismal name, like that of many other bipeds, is particularly inappropriate.

On the mountains at the opposite, that is to say the south-east, end of the island of New Guinea, other species of Gardener-birds have since been discovered, and in these also the females are unadorned and the males have beautiful crests. One of these birds is called *Amblyornis musgravianus* because it was found on Mount Musgrave. Like its relatives, it is a lively and keen-sighted bird and very shy, so that a great deal of patience is required to observe it at play. Mr. Goodwin describes its bower as being constructed of moss, in the form of a fountain-basin. The rim is about two feet high from the ground, but the cup is quite shallow, so that the bird can see what is going on in the neighbourhood while he is playing inside it. The mossy lining is beautifully smooth and even, and from the centre, where the jet of water would be in a real fountain, there springs a small tree on which the bird amuses himself by arranging twigs, uttering meanwhile the clear, sharp notes of his song.

During the return journey, while on Mount Belford, Mr. Goodwin tells us that the member of his party from whom that mountain takes its name brought into camp a different kind of Bower-bird, very similar to the Mount Musgrave bird, but smaller. It was a specimen of the Gardener-bird known as *Amblyornis subalaris*, and Mr. Goodwin did not leave the mountain until he had been to look at its playground. "At a short distance off," he tells us, "the bower from the back looks like a cartload of sticks rounded on the top. On going round to the front I saw the most beautiful building ever constructed by a bird, to which, however, my poor description cannot do justice. The edifice was dome-like, only half covered over, and exposed to view inside a ring or circus. In the centre of this



PLAY-HOUSE OF A GARDENER BOWER-BIRD

These birds (*Amblyornis subalaris*) construct a beautiful domed hut around a small tree or shrub, which they interlace with twigs. At the foot of the tree, inside the hut, they build up a bank of moss and decorate it with flowers. In this pretty pavilion they spend many hours at play.

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was built a bank of moss, decorated with flowers and seed, out of which grew a small tree interlaced with sticks. . . . I was certainly well rewarded for my trouble on this occasion, and felt much indebted to Mr. Belford for having shown me the most interesting sight which I witnessed during the whole of the expedition."

The charming picture which Mr. Vanderlyn has made for us will give you a better idea than any description of what this wonderful playhouse is like. But to realise fully its beauty you must know that the floor is covered with a carpet of the greenest and most delicate moss; you must imagine the brightness of the moss-covered pillar in the centre, gaily decorated with flowers; and, finally, you must picture to yourself the bird's crest of shining gold, and the glittering wing-cases of beetles which he loves to have among his toys; and then I think that you will agree that the life of a bird which can make and possess such beautiful things must be very romantic indeed.

One other Bower-bird we will mention, and then we must take leave of these fascinating creatures. For this, the Golden Bower-bird (*Prionodura newtoniana*), we must return to Australia, where, in Queensland, he makes his home. No Bower-bird is more beautiful, and none more clever. He is clothed from head to tail in golden-coloured feathers, and bears on his head a broad crest of the same bright hue; but his wife is garbed in sober plumage of olive-brown. The Lyre-bird is not a more accomplished mimic. He will croak like a tree-frog; he will utter a low, soft, musical whistle with the most pathetic air; and then he will break into an astonishing variety entertainment in which he gives imitations of all his neighbours. But his skill is not confined to one of the arts, for not even the beautiful gardens and pavilions of the New Guinea Gardener-bird are more remarkable than the elaborate pleasure-grounds which these Queensland birds prepare.

Around two trees, or a tree and a bush, they begin by erecting huge piles of sticks, heaping them up in the form of a cone

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or pyramid to a man's height. These stick pyramids are four or five feet apart, and one of them is always considerably higher than the other. The birds then fetch from the surrounding scrub long pieces of the thin, flexible stems of creepers, and trail them from one heap of sticks to the other, in such quantities that at last the two pillars are converted into a great archway. The builders next turn their attention to the decorations. In the woods they gather tufts of white moss which they fix all over the pillars and roof of the structure, and last of all, bunches of green berries, like wild grapes, which are hung in clusters from the top. But still they are not satisfied, for all around their great bower they make little huts by bending together the strong stems of standing grass and roofing them over with a flat thatch of slender twigs, until at last the pleasure-ground looks exactly like a miniature model of a native camp with a beautiful triumphal arch in the middle.

Birds of all ages and both sexes resort to this place of amusement. Young and old, male and female, they pursue each other in and out of the grassy huts and through and over the archway, playing merrily to their hearts' content.

CHAPTER IX

COURTSHIP

Excess of bachelors amongst birds, and its results—Arts of peace—Singing for a mate—The meaning of song—Song and dance—Instrumental music—The drumming of Snipes—Courtship flights—The dalliance of Eagles—Antics of Game-birds—The indifference of hens—Bustards in Spain—Coyness and provocation—Feminine boldness : the Northern Phalarope—Good-humoured rivalry : the Flickers.

IF we are sufficiently observant we may find something to interest us in the habits of birds at all times ; or at all events in the ways of wild birds, for it must be admitted that birds in captivity often lose a great deal of their spirit and energy because they are deprived of both the necessity and the opportunity of exercising their natural powers. In the case of the more precocious birds, such as the common Fowl, the first days of life after they have escaped from the egg are, I incline to think, usually the most interesting and wonderful of all ; but speaking of birds in general there are two periods which particularly attract attention. These are the time of wooing and, a little later, the time when the care of a young family absorbs all the energies of the attentive parents. As a rule it is the female who is seen at her best in bringing up the brood, and the male during courtship, but it must not be supposed that this is so in all cases.

Nature is very wise, and no male bird remains a bachelor if he can avoid it, nor does any female long despise the attentions of a worthy suitor. But so far as we are able to judge, there are more males than females in bird society, with the result that while every hen almost certainly obtains a mate, great numbers of

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cock-birds fail to do so. Even amongst birds, therefore, the privilege of winning a wife is not to be attained without some individual merit, and often not without strife.

The methods by which the male bird woos her whom he wishes to make his partner are many, and very different amongst the various classes of birds. What we usually find is, that whatever a particular kind of bird excels in at ordinary times, he does especially well when he is courting, and employs as a means of winning the object of his desires. He exercises to the utmost every charm, and tries to exhibit himself in the best light in order to rival his fellows. The older he is, and the more experienced, the more skilful and confident he becomes in his wooing; his energy and determination increase with his skill in practising the arts of his kind, and with them his success as a wooer increases.

As the season of love approaches, the song-bird practises his notes and perfects his song; he sings his loudest and sweetest—or if his voice be not sweet, his harshest and hoarsest—but always, no doubt, according to the taste of the species to which he belongs, his best. It is the song-bird which can most afford to rely on the exercise of art to gain a mate. Other birds, far more than he, must wander from place to place seeking her, but a song-bird will perch where he can be heard to the best advantage and endeavour to attract her from afar with passionate melody. He expresses all his spirit and strength and longing in song, and when at last the female answers the call, his joy and exultation. In song he invites her to come to him, and dares any other male within hearing to enter into rivalry with him. He is pleading, imperious, persuasive, boastful, triumphant.

True song ought perhaps to be distinguished from the call-notes, danger-signals, cries of alarm or challenge and defiance, and so forth, which are uttered by birds, though it is sometimes difficult to say exactly what is song and what is not. The cry of the Cuckoo, for example, is not song in the narrow sense; but as it is a call-note to attract a mate it is a part of the bird's

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courtship. It is never uttered except during the pairing season.

Darwin considered that bird-song originated as a method of courtship, and he was probably right, though some naturalists think he was mistaken. They point out that many birds sing long before and long after the mating season, at times when there is no thought of courtship; but that does not prove that the original object of song was not to win a mate, any more than the fact that birds fly when there is no necessity for them to do so, either to seek food or to escape an enemy, proves that those were not the causes in which flight originated.

All the higher animals do things in play which they are not obliged to do at the time, but which are at some time or other necessary for their existence, and they enjoy performing these actions. So many birds practise singing, and take pleasure in it, at times when song is not of any particular immediate use to them. The Redbreast and the Wren are familiar examples of birds that sing all the year round except during hard frost and at the time of moulting. But the consummate master of song, the Nightingale, loses his singing voice as soon as his chicks are hatched; the passionate melody which thrilled us while he was courting his mate and entertaining her at the time of brooding is exchanged for a guttural croak of alarm and anxiety, and if all go well he sings no more until the following spring. If all go well, we say; for it is a remarkable fact that if any accident deprive him of nest or little ones at this early time, he once more recovers his singing voice and so charms his mate that she is content to undertake again the toil of building a new nest and to endure the weariness of brooding once more; and that surely teaches us the true original purpose and meaning of song. There are those who believe that a bird's song is merely an expression of his superfluous vitality and enjoyment of life; but though joyousness, and other emotions too, do find utterance in melody, we must still consider song as being chiefly and pre-eminently an act of courtship.

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Sometimes several males will sing in rivalry for the favour of the same female. Skylarks often do so. These birds pair in early spring, when the cold March winds are drying up the broad, open lands where they love to make their nests, and the first flowers are beginning to make the hedgerows bright with colour. Frequently at this time a female may be seen flying swiftly through the air pursued by several males, who toy with her, flutter round her, and burst into snatches of joyous song. Hither and thither they dart, until at last she takes refuge in the herbage and crouches low. Soon she is discovered by one of her suitors, who hovers above her singing sweetly, or alights and runs before her with raised crest, trying in various ways to win her favour. Again she takes wing, and the pursuit is renewed in the same playful, joyous manner. Sometimes a male actively resents the presence of rivals, and they begin to chase each other until, perhaps, the arts of peace give place to active warfare and the strongest and boldest remains in possession of the field.

It has been noticed that some of our songsters, of which the Redbreast is one, at certain moments in their wooing, exchange their loud, clear, rippling song for low, vibrating notes which can scarcely be heard a few yards away. This whispered melody is uttered only when the mate is perched close by, and is usually accompanied by bowing and posturing, or by quick little dancing steps.

Unlike the Skylark, most of our true melodists sit still on their perch while singing; but among foreign birds there are many whose courtship song is accompanied by antics, though it is seldom that the song of such birds is remarkable for its sweetness. Many of the family of American birds which are commonly known as Troupials and Grackles, Starling-like birds with some of the character of our Buntings, indulge in such antics, and especially the Cowpen-birds, whose courtship habits have been described by Mr. Hudson. The male Screaming Cow-bird of La Plata puffs out his plumage like a strutting Turkey-cock and hops briskly up and down his perch in a lively

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dance, with wings and tail spread out and trailing low, while he utters a hollow-sounding note which ends in a sharp bell-like ring. The female replies with an excited scream, and the dance ends. The common Cow-bird, which has rich violet plumage, puffs out his glossy feathers and rapidly flutters his wings during his song, which begins on a series of deep internal sounds followed by clear, ringing, musical notes. He then suddenly leaves his perch and flutters away over the ground like a huge moth for twenty or thirty yards, when he turns aside and circles round the female, singing loudly all the time and "hedging her in with melody."

Birds which have no singing voice use such vocal powers as they may possess with equal effect in their wooing. The Great Black-backed Gull (*Larus marinus*) fills the air with his harsh, laughing cries when the flocks assemble in the early summer, until the rocks echo again, and no doubt impresses his mate as much by his furious shouting—if we may use the word in speaking of a bird—as by his more or less graceful bowing as he swims around her. Even the male Swan manages to croon a little love-song of a sort. With wings expanded and head held proudly erect, he places himself opposite his mate and utters a curious little double note, the first part of which is very short and glides into the second part, a semitone higher. The female responds with a similar cry half a note lower. Fortunately they do not both sing at the same time!

The birds which do not excel as vocalists, but produce what Darwin referred to as *instrumental* music, practise their art with great vigour at the season of pairing. The Snipe 'drums' his loudest; the Nuthatch makes such a clatter with his bill against a dead bough that he can be heard two or three hundred yards off; the Woodpecker hammers with all his might; and the clapping of the Stork can be heard when the bird himself is so far away as to be invisible. Other birds produce all kinds of strange noises by means of their quill feathers or by beating with their wings.

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The 'drumming' or 'bleating' of the Snipe was long a puzzle to naturalists and sportsmen, for nobody could explain satisfactorily how the sound was produced. The bird flies to a great height, and after zigzagging about for a little while descends to earth at a terrific speed, with tail outspread and wings a-quiver; and it is then that the strange humming sound is heard. During the descent the two outer tail-feathers are spread out beyond the rest. These feathers are of a peculiar shape, and it has been ascertained that if they be fixed firmly in a cork, attached to a short stick on the end of a string, and whirled round, a typical 'drumming' is produced. There is no doubt that in the living bird it is similarly caused by rapid movement of these feathers through the air during the earthward plunge. While giving this instrumental performance the bird utters calls which sound like *tinker, tinker, tinker*, and is answered by a quick little *djepp, djepp, djepp* in a different key.

The Double or Solitary Snipe (*Scolopax major*), which visits Great Britain in small numbers every autumn, drums while on the ground by throwing back its head almost on to its back and rapidly opening and shutting its beak like a Stork, the result being a noise which resembles that caused by running one's finger along the edge of a comb.

Certain small perching birds of South America called Manakins have some of the secondary wing-feathers in the male of an extraordinary form, with a solid horny lump on the shaft, and give remarkable instrumental performances. One species, *Manacus candæi*, begins with a sharp sound like the crack of a whip, following it up with a harsh rattle like the turn of a key when winding a clock. Rattle and snap and whirr and whizz are variously combined in the courtship of other members of this curious family, till it seems hardly possible that so much noise can be produced by birds so small.

Another South American bird, one of the Guans (*Penelope*), rushes down through the air with outstretched wings, which give

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forth a crashing sound like the falling of a tree. The Guans are Game-birds; other members of the order produce curious sounds in various ways—by striking their wings together or violently beating the air with them, and so on.

For the present we will leave the musicians, both vocal and instrumental, and consider how the birds which are especially remarkable for their powers of flight conduct their courtship. Foremost amongst these are the Birds-of-Prey, nearly all of which, except Owls and some Falcons, join with their mates in wonderful aerial dances. Eagles, Peregrines, Kestrels, and Buzzards circle round and round each other and ring up to the sky, where they perform marvellous tricks of flight, whirling in their giddy course for hours at a time until, having sufficiently displayed the power of wing which is so important to them in making provision for a hungry family, they glide to a perch and practise other arts. But they are never so majestic as when in flight, and even the mighty Condor looks an awkward creature when, his head bowed and wings spread wide, he hops round his mate with clumsy little steps, making strange murmuring sounds.

The courtship flight of a pair of Eagles has often been described. Brehm, writing of the Bateleur Eagle of Africa, speaks of it as “an incomparable mountebank performance in the air, a bewildering acrobatic display, which seems to unite in itself all the arts of flight practised by all the other Birds-of-Prey.” Perhaps we get the finest picture of all in Walt Whitman’s description of the dalliance of Eagles “high in space together”—

The clinching interlocking claws, a living, fierce, gyrating wheel,
Four beating wings, two beaks, a swirling mass tight grappling,
In tumbling turning clustering loops, straight downward falling,
Till o’er the river pois’d, the twain yet one, a moment’s lull,
A motionless still balance in the air, then parting, talons loosing,
Upward again on slow-firm pinions slanting, their separate diverse
flight,
She hers, he his, pursuing.

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Reading it, we can almost hear "the sudden muffled sound" and see the mad, tumultuous, downward rush, arrested at the very moment when it seems that both birds must inevitably be plunged together into the river below.

The smaller Birds-of-Prey are hardly less wonderful in their gambols. Watch a pair of Harriers starting on such a flight. It begins tamely enough, the female flying on ahead as though quite unconscious that she is attended, followed by the male, who appears to be only half willing to escort her. But in a moment all that changes. He dashes forward, overtakes her, sweeps round and round, and then deliberately turns his back upon her and soars to the clouds on hurrying pinions. Suddenly, at a great height, he turns right over and with folded wings shoots head downwards, like an arrow, towards his companion. His wings fly open again, and once more he is dashing round and round her, carried on by the tremendous speed of that plunge from the clouds. At last she can resist the invitation no longer; her unresponsive mood is past, and she joins merrily in his gambols.

Other birds less powerful in flight than the Birds-of-Prey, but some of them hardly less skilful, feel the same impulse to use their wings in courtship. The Swallow who has been perched close beside his mate warbling his faint little song suddenly leaves his perch and, followed at once by the female, dashes off with her in a mazy flight, singing as he goes. Or at dusk, when the Nightjar makes his strange, whirring sounds as he crouches lengthwise on a bough, his mate comes to his calling, and together they dance through the air in beautiful curves.

The cries produced by members of the Nightjar family are very curious. In America the best known of these cries is the "*whip-poor-will*" uttered by the bird of that name. Captain Bendire, in his book on North American birds, tells how he witnessed a most amusing performance of a pair of Whip-poor-wills whose trysting-place was a heap of sand just beside an outhouse. One evening when he happened to be in the

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shed soon after sundown his attention was attracted by the familiar Whip-poor-will cry uttered quite close at hand. Peering through a small opening, he saw the bird waddling over the sand-heap in an excited manner, so much interested in its own vocal performance that it did not discover it was being watched. The call was repeated with such rapidity that the sound issued from the bird's great gaping mouth almost in one continuous roll. In a few seconds another bird appeared and joined the first; the new arrival was a female, and she at once lowered her head and answered the impatient calling with a low "gaw-gaw-gaw" of endearment. The male sidled up to her and for a moment their bills touched; but then she began to move slowly aside, followed closely by her mate. Presently, however, the movement was reversed—he became coy, and she followed; and so on, from minute to minute, bold and coy by turns, until the house-dog, an inveterate enemy of all Whip-poor-wills, appeared on the scene and put the lovers to flight. On subsequent evenings they did not arrive so early and so were not seen again, though fresh tracks in the sand showed that they continued to make the same spot their place of meeting.

The courtship dances are often wild, ecstatic performances accompanied by strange sounds, and ending in a mad whirl in concert or in a transport of excitement which makes the birds oblivious to what is taking place around them.

The Game-birds are the most famous of bird-dancers, and nearly all of them perform some antics or other from time to time. Even in the poultry-yard we see the Cock showing off before his wives, strutting proudly hither and thither, crowing and flapping his wings. The Turkey is a more finished performer; as he dances about with tail widely spread and trailing wings he appears the very personification of conscious pride, though in this respect he is far surpassed by the Peacock. The way in which a Peacock approaches his lady-love is peculiar. Placing himself at some distance from her, he erects his train in a gorgeous fan and then, seizing a favourable opportunity,

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rushes towards her *backwards* until, arrived within a foot or so, he suddenly whirls round and tries to overwhelm her with the glory of his plumage. His display, however, is not received with any obvious signs of admiration; on the contrary, the modest hen remains conspicuously indifferent, or appears so, even when the sudden transformation is emphasised by an ear-splitting scream. Both Peacock and Turkey produce music of the instrumental kind during their performance, the Turkey by scraping his quills along the ground, the Peacock by rattling his together, with a sound like the pattering of rain on leaves, as he turns towards his partner.

The courtship of Reinhardt's Ptarmigan (*Lagopus rupestris reinhardti*) of Greenland and Labrador is a very eccentric performance. Having discovered an eligible partner, he begins to run around her with tail spread and trailing wings; as his ardour increases he ruffles every feather of his body and, with outstretched neck and breast pressing upon the ground, thrusts himself along, uttering a curious growling sound. He writhes and twists his neck about in a wonderful manner, and at last in his excitement performs the most astonishing antics, leaping in the air with extraordinary vigour, and even rolling over and over.

Behaviour quite so violent as this is rare, but grotesque postures and contortions are seen in many species, especially in those which have some peculiar decoration to display. Such birds are immediately prompted to put themselves into the most showy attitude by the presence of the female or a rival, or even that of a stranger. Crests and plumes are raised, wings or tail spread, and various other means adopted to make any striking feature as conspicuous as possible. The result sometimes appears to us ridiculous in the extreme, but there is little doubt that the female is, as a rule, much impressed by the display of so much finery.

Occasionally, however, she seems to be singularly indifferent to the personal charms of her wooer, be they displayed never



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In their native haunts in India and Ceylon scores of peacocks may occasionally be seen perching together in high trees, and producing a wonderful blaze of gorgeous colour. The peacock's true tail is rather short, and is quite hidden except during display, when it may be seen from behind, helping to support the outspread train feathers.

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so bravely. You may frequently observe this amongst domestic Pigeons. Watch a group of these birds picking up grain which has been scattered for them upon the ground ; it is very likely that before long you will see a handsome cock-bird begin to pay court to a sober-looking hen. He puffs out his breast and throat to make himself look imposing and to display the glossy iridescent feathers to the best advantage ; meanwhile he coos softly and bows time after time to the quiet little hen, running after her with quick steps and doing his very best to attract her attention. She for her part seems quite indifferent ; she is far too busy picking up grains of food to trouble about the fussy courtier ; she seems to show by her attitude that she thinks him a tiresome fellow, and cannot be bothered ; and will he please go away ? But he is far from being discouraged, and at last she runs forward a few steps to escape persecution ; but he makes a flank movement, runs round in a little quarter-circle, and is once more in front of her, bowing, cooing, trailing his outspread tail along the ground, and using all his arts with undiminished zeal. It is most often in the spring and summer that one may see Pigeons behaving in this manner, but quite recently, in a London street, I observed the same little comedy being enacted amidst heavy rain in the middle of December. Neither the storm nor the season could affect the wooer's devotion.

A few years ago, when in Spain, in the neighbourhood of Seville, I was even more impressed by the efforts of a male bird to make himself attractive while the female remained absolutely unmoved. On a broad, open tract of cultivated land, less than half a mile from the road, a number of large birds were quietly feeding. With the aid of glasses I was able to make out that it was a small party of Bustards—the Great Bustard (*Otis tarda*), which used, long ago, to frequent the downs, wolds, and plains in England, but which has now been extinct as a native species for about three-quarters of a century. Perhaps it was never very common here, though there are records of it

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having been at one time hunted with greyhounds on Newmarket Heath. Even in the sixteenth century, however, when Bustards were a favourite dish at great feasts, they were considered articles of special luxury and ranked in value with such birds as Swans and Cranes. But in Spain they are still fairly common, and great was my delight at having an opportunity of watching them in their wild state.

The party consisted of four females and a male. The hen Bustard is considerably smaller than the cock, which is a fine bird, between three and four feet in length from the tip of the bill to the end of the tail, and has a very stately and conspicuous appearance on the open country which he frequents. His colour is not very remarkable, pale grey and white predominating; but the back is beautifully barred with russet and black, and during the springtime a band of deep tawny brown sweeps down from either shoulder over the breast. His general aspect is made more striking by a beard of slender greyish-white feathers which spring out stiffly on either side of the chin. While I was observing the little group of birds, the male left off feeding and presently, after strutting to and fro for a short time, with head and tail both held proudly erect, he placed himself in the very remarkable attitude adopted by these birds when 'showing off.' The breast and upper part of the throat are puffed out to their utmost extent; at the same time the head is drawn far back and buried between the shoulders, while the tail is turned forwards flat upon the back, until head and tail almost meet between the wings. The wings themselves are then drooped from the shoulder, the ends of the long flight feathers are hitched up on the back across the tail, while the shorter feathers turn stiffly upwards and almost completely hide the head, the 'beard' alone being seen standing smartly up between them. The result of all these curious contortions is to display to the fullest extent the white feathers of the upper part of the wings and those under the tail.

In this strange posture my Bustard strutted up and down

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before his wives for fully five minutes, but not one of them paid any attention to his performance or allowed herself to be diverted from her immediate occupation of feeding. At the end of that time he seemed suddenly to decide that perhaps they were right, after all, and that in any case it was not much use trying to show them what a very fine figure of a bird he was if none would admire him, for his head came up with a jerk, his wings were folded close to his body again, his breast gently subsided, and resuming his ordinary appearance he began once more quietly feeding with the others.

Bustards are very wary birds and it is exceedingly difficult to get quite near to them, but like many other wild creatures they appear to have a curious power of discrimination, so that while a sportsman carrying a gun may find it impossible to get within range of them, they do not so readily take alarm at the passage of an ordinary wayfarer.

A smaller kind of Bustard known as the Florikin (*Sypheotis bengalensis*), which is one of the most valued Game-birds in all parts of India, where it is frequently killed during a tiger-hunt and is occasionally taken by the help of the Falcon, is known to adopt somewhat unusual and remarkable tactics to attract a mate. The male bird rises, with hurried flapping of the wings, straight up into the air, pausing from time to time for a few seconds and then flying a little higher. While doing this he raises his crest, puffs out his neck, and makes a peculiar kind of humming noise. The performance is repeated several times until a hen obeys the summons and approaches from the thick grass, where they live apart. On her arrival he begins to entertain her by showing off in much the same manner as a Turkey-cock. The male Willow-Grouse in North America practises similar flights; his call, however, is often accepted as a challenge by some rival male, and fierce combats follow.

A very large number of birds puff out their feathers when courting in order to make themselves appear as big and important as possible; even the tiny Blue Titmouse swells himself

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out to almost twice his usual size in the intervals of sailing from the top of one slender spray to another amongst the trees and bushes—a method of flight quite different from his ordinary movement from place to place—when dallying with his mate.

We have seen that it is not unusual for the female to receive the attentions of her wooer at first with apparent indifference, if not annoyance. In some cases she at length appears slowly to become aware of his existence, to display a sort of languid interest in his proceedings, to be willing to listen, without prejudice, to what he has to say, to spare a moment for a critical glance at his antics. Sometimes on hearing the sound of a performing male she may even deign to approach and stand by, hidden in the bushes, an interested spectator; she may utter little cries—perhaps her way of saying “Bravo!”—to incite him to further efforts, and may eventually, without reserve, seek his company.

In other cases, however, she is more coy and takes to flight—whether in earnest or not, who can say? Though her retreat be swift and energetic at first, it is often continued with little persistence, and it seems as if she wished to be overtaken.

Dr. Groos says: “The female Cuckoo answers the call of her mate with an alluring laugh that excites him to the utmost, but it is long before she gives herself up to him. A mad chase through the tree tops ensues, during which she constantly incites him with that mocking call, till the poor fellow is fairly driven crazy. The female Kingfisher often torments her devoted lover for half a day, coming and calling him, and then taking to flight. But she never lets him out of her sight the while, looking back as she flies and measuring her speed, and wheeling back when he suddenly gives up the pursuit. The Bower-bird leads her mate a chase up and down their skilfully built pleasure-house, and many other birds behave in a similar way. The male must exercise all his arts . . . before her reluctance is overcome. She leads him on from limb to limb,

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from tree to tree, constantly eluding his eager pursuit until it seems that the tantalising change from allurement to resistance must include an element of mischievous playfulness."

There are birds, however, amongst which the hens are so far from being coy and retiring that they are actually the ones who make all the advances in courtship. In such cases we find that, contrary to what is the general rule amongst birds, the hen is the finer and better looking of the pair. As an example of these we will take the Phalaropes.

The Phalaropes are wading birds, and they nest in the Arctic regions, where they are extremely tame. In many species of waders—perhaps in all—the hen-bird is distinguished by her larger size and longer bill, but her superiority seldom extends to plumage. Among the Phalaropes, however, the females are not only larger, but brighter in colour than their partners, and in accordance with the general custom amongst birds in such cases they take the lead in courtship. Here is the interesting account of their proceedings given by Mr. E. W. Nelson, the well-known American field naturalist, who observed the Red-necked or Northern Phalarope (*Phalaropus hyperboreus*) in Alaska.

"As summer approaches on the Arctic shores and the coast of Bering Sea, the numberless pools, until now hidden under a snowy covering, become bordered or covered with water; the mud about their edges begins to soften, and through the water the melting ice at the bottom looks pale green. The Ducks and the Geese fill the air with their loud resounding cries, and the rapid wing-strokes of arriving and departing flocks add a heavy bass to the chorus which greets the opening of another glad season in the wilds of the cheerless north. Amid this loud-tongued multitude suddenly appears the graceful, fairy-like form of the Northern Phalarope. Perhaps, as the hunter sits by the border of a secluded pool still half covered with snow and ice, a pair of slight wings flit before him, and there, riding on the water, scarcely making a ripple, floats this charm-

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ing and elegant bird. It glides hither and thither on the water, apparently drifted by its fancy, and skims about the pool like an autumn leaf wafted before the playful zephyrs on some embosomed lakelet in the forest. The delicate tints and slender, fragile form, combining grace of colour and outline with a peculiarly dainty elegance of motion, render this the most lovely and attractive bird amongst its handsome congeners.

“ . . . In the last few days of May and June they are on hand in full force and ready to set about the season's cares. Every pool now has from one to several pairs of these birds. . . . The female . . . is much more richly coloured than the male, and possesses all the 'rights' demanded by the most radical reformers. As the season comes on . . . the dull-coloured male moves about the pool apparently heedless of the surrounding females. Such stoical indifference usually appears too much for the feelings of some of the fair ones to bear. A female coyly glides close to him and bows her head in pretty submissiveness, but he turns away, pecks at a bit of food and moves off; she follows, and he quickens his speed, but in vain; he is her choice, and she proudly arches her neck, and in many circles passes and repasses close before the harassed bachelor. He turns his breast first to one side, then to the other, as though to escape, but there is his gentle wooer ever pressing her suit before him. Frequently he takes flight to another part of the pool, but all to no purpose. If with affected indifference he tries to feed, she swims along side by side, almost touching him, and at intervals rises on wing above him, and, poised a foot or two over his back, makes a half-dozen quick, sharp wing-strokes, producing a series of sharp, whistling noises in rapid succession.

“ In the course of time it is said that water will wear the hardest rock, and it is certain that time and importunity have their full effect upon the male of this Phalarope, and soon all are comfortably married. . . . About June 1 the dry, rounded side of a little knoll, near some small pond, has four

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dark, heavily marked eggs laid in a slight hollow, upon whatever lining the spot affords, or, more rarely, upon a few dry straws and grass-blades, brought and loosely laid together by the birds. Here the captive male is introduced to his new duties, and spends half his time on the eggs, while the female keeps about the pool close by. In due time the young are hatched and come forth, beautiful little balls of buff and brown."

With the more pugnacious birds, such as the Willow-Grouse, courtship and battle often go together; but many species are quite good-natured and peaceful in their rivalry—none more so, perhaps, than that common and conspicuous North American bird, the Golden-winged Woodpecker or Flicker (*Colaptes auratus*). This bird always seems to be on the best of terms with its neighbours, even when courting, and the sight of a couple of males paying their addresses to the same female is one of the most amusing comedies in bird-life. Their apparent shyness as they sidle up to her and hurriedly retire again, their queer little games of bo-peep as they slyly watch one another's advances from the shelter of some convenient limb of the tree, are exceedingly comic, and when at last the choice is made, the unsuccessful suitor retreats with dignity, taking his defeat quite philosophically, and no doubt enters into an equally friendly contest elsewhere.

Many chapters might be written on this fascinating theme of the courtship of birds, for the subject is almost inexhaustible and the methods adopted are of endless variety. As elsewhere in the animal kingdom, so amongst birds, love and war often go together; it will be convenient, therefore, if we next take a glance at some of the many ways in which they fight their battles.

CHAPTER X

FIGHTING

Weapons: beaks, claws, spurs, 'knobs,' wings, and wing-spurs—Pugnacity of Game-birds—Protective colouration: a digression—Tournaments—Fighting-cocks—A race of Amazons: the Bustard-Quails—Moral effect of victory—Kickers—The 'Fighting Ruffs'—Wing-spurs as weapons—"The Faithful Jacana"—Some familiar examples—Dabchick *versus* Swan—Family feuds of Moorhens—Battles in the air—Peacemakers.

THOUGH many birds go through life "as gently as any sucking dove," appearing to be always on amicable terms with their fellows, and, like the Flicker described in the last chapter, friendly even in their rivalry, it must be admitted that others are by no means of a peaceful disposition, and not a few are as eager for a fight as an Irishman at a fair.

There is almost as much difference in the methods of fighting adopted by the various species as there is in their behaviour during courtship, their manner of feeding, or the way in which they perform other important actions and duties. As a great deal depends upon the weapons with which a bird is endowed, it will perhaps be well to consider these first of all.

As a rule, bill, feet, and wings all play their part in bird battles, though in different degrees. Amongst such birds as Crows, Starlings, Larks, and Finches—all those, in fact, which are known as *Passerines*—the bill is the chief weapon of offence; but the wings also are employed for buffeting the adversary; the feet are used mainly to hold or guard. In many of these birds, however, the beak is not a very dangerous weapon, and they are not able to inflict really serious injury in their quarrels. In others it is far more terrible, and can be used to give powerful

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strokes with the swiftness of a snake striking its prey. I remember on one occasion seeing a visitor at the 'Zoo' insert a finger through the wires of the pen where the Ravens are kept. Before he could be warned of the danger he drew back with a cry of pain, having received an ugly wound from a sharp peck administered by one of the birds. Parrots, too, can inflict severe punishment with their formidable bills; and during the famous *Challenger* expedition, several members learnt by experience that it was not safe to go amongst the Penguins in one of the vast 'rookeries' without good stout gaiters to protect their legs.

Claws can be as formidable as beaks—more so, indeed, for they are the weapons of Birds-of-Prey, some of which can tear asunder large snakes or break the neck of a young antelope by mere strength of foot. The Harpy Eagle (*Thrasaëtus harpyia*) of America is said to be able to seize a cat fore and aft and tear it asunder. Where a dangerous claw arms the foot of a heavy bird, which can not only kick with considerable force, but is a good leaper, as in the case of the Cassowary, it is wise to treat its possessor with respect.

Other birds rely chiefly on their wings when fighting—not for the purpose of escape, but as offensive weapons. There are many stories of broken arms and similar injuries resulting from the blow of a Swan's wing, but I think there is considerable doubt as to their truth. Yet although they may not be able to break a limb, it is quite certain that Swans can deliver very severe blows with their wings, and so can Geese. In many birds the wings are armed with knobs, which add to their effectiveness as weapons.

The ordinary position for spurs, however, is of course at the back of the foot, higher up than the 'toes,' and they are the most deadly weapons possessed by birds, except the talons of a Bird-of-Prey. They are only found in the Pheasant family, and are, as far as I know, seen at their best in the Jungle-Fowl (which is the ancestor of our domestic poultry),

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and in their descendants, the Game-cocks. The spurs, which are bony growths covered with a horny sheath, and so resemble the horns of cattle and antelopes, are often very long and sharp. Some birds—for instance, the Double-spurred Peacock—have two on each foot, a few have three, and the Blood-Pheasant has as many as four or five. Only cock-birds have the spurs well developed, though in the Indian Spur-Fowl (*Galloperdix*) even the hens possess two or three pairs.

Sometimes a knob takes the place of a spur; this is so in the French Partridge, and some Guinea Fowls possess several such knobs.

The most determined fighters are undoubtedly found amongst the Game-birds, especially at the season of pairing. At that time the males of many species are extraordinarily pugnacious, and seem to be not only always ready for a fight, but constantly on the look out for an opponent, doing their very best to attract a rival and to challenge him to combat. It is well known that two cock Pheasants will not endure each other's presence in one small drive, and that they fight duels until one or the other is badly beaten and is compelled to leave the neighbourhood. The most remarkable instances of pugnacity are found, however, amongst the various species of Grouse, and when two suitors for the same hen come together very fierce and desperate encounters ensue, while the hen runs round cheeping, and thoroughly enjoying the duel. A battle between two vigorous birds may continue for hours, until the ground is strewn over with feathers from the head and breast. In some cases, as in that of Reinhardt's Ptarmigan (*Lagopus rupestris reinhardti*), the bird which is being driven away tries to win by strategy. He lures his pursuer to a considerable distance and then suddenly dashes back to the hen, who, in this species, appears to take very little interest in the engagement, but remains quietly feeding or resting in a perfectly unconcerned manner. This is the more remarkable because the devotion of the male is carried to extremes. He



PTARMIGAN: A STUDY IN COSTUME

The ptarmigan changes colour as the seasons change; in winter his plumage has the dazzling whiteness of snow, but as the spring comes his coat changes to a brown hue, mottled with yellow, so that he can hardly be detected as he crouches motionless among the lichen-covered stones of his favourite hill-sides.

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would die rather than leave her side, and sportsmen have observed that he often places himself between his partner and the danger by which she is threatened, uttering warning cries and doing his utmost to draw attention to himself while she escapes out of harm's way.

Reference to the Ptarmigans tempts us to make a short digression concerning the subject of protective colouration, of which these birds supply a remarkable instance, showing how admirably the colour of a bird may be adapted to the prevailing hue of its haunts. The species of Ptarmigan (*Lagopus mutus*) which is found in Britain makes its home on the highest and most barren of the Scotch mountains, on stony, lichen-splashed and moss-grown slopes. In the springtime the bird wears a dress of brown mottled with a yellowish hue, a garb admirably in keeping with the mosses and lichens amongst which it lives; but as the summer wears on the colour gradually changes, so that by the time autumn has come, with scorched vegetation and lichens bleached by the sun, its robe is one of pale grey variegated with black. Then come the winter snows, which lie upon the hill-tops and form a white background against which the autumn plumage would stand out with dangerous distinctness; but nature has made provision against this too, for our little friend puts off what colour remained, and dons a coat of almost wholly pure white—a dazzling white which is the whiteness of the snow in that clear atmosphere, and which is worn until spring melts the snow and brings back the brown-and-yellow garb with the new growth of lichens and mosses. The value of these changes as a means of protection is clear when we consider the birds' habits, for at sight of one of the more powerful Birds-of-Prey, or after being flushed several times by man, they cower down motionless among the stones from which they can scarcely be distinguished.

This is an exceptionally remarkable instance of protective colouration because of the variety of the circumstances and the manner in which they are met, but the same general principle

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can be observed in a host of different species—the sand-coloured desert birds, the green-plumaged inhabitants of tropical forests, the striped and barred species which skulk in reedy swamps, and many others. All such birds have the habit of remaining motionless when alarmed, and so long as they do that they stand an excellent chance of escaping detection.

To return now to the subject of this chapter. There are few features in connection with bird-life more thoroughly picturesque and romantic than the tournaments in which certain species of Game-birds take part in the spring. We cannot give more than a single instance of these remarkable meetings here, but we are fortunate in possessing amongst our British birds one which furnishes an admirable example. This is the Black Grouse (*Lyrurus tetrix*), the male and female of which are known respectively as the Blackcock and Greyhen—a species which is found over the heath-country of England and Scotland, and in North Wales, though it appears, unhappily, to be decreasing in certain districts. On the moors of North Staffordshire and Derbyshire, for instance, where I met with it on some occasions when I was a boy, I have not observed it for many years.

For their tournaments Blackcock choose a spot usually known as the ‘playing-grounds,’ to which all birds burning to display their valour and strength of bill regularly resort. The meeting place is on a level, grassy space near the roosting-grounds, and the birds assemble at earliest dawn, the males usually coming first, though occasionally they arrive together. The loud calls of the Blackcock are heard on all sides, and as soon as several birds are on the ground the fighting begins. Two rivals enter the lists and assume the fighting attitude, lowering their heads, spreading their tails, with the beautiful curved outer feathers, and trailing their long flight feathers along the ground. Slowly they advance, with gestures expressive of rage and fury, till they come within skirmishing distance, when they watch each other warily or close in and fence at close quarters. Suddenly

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one of them makes a dash at his adversary and seizes him by the scruff of the neck, hammering him over the head vigorously with both wings till he is glad to get clear and escape to some quiet corner to recover before entering for another contest. The victor meanwhile gives his feathers a shake and takes possession of a grassy mound, which he is prepared to hold against all comers. He begins to utter his war-song, and has probably not long to wait before his challenge is accepted, but he is wise enough not to leave his point of vantage on the hillock until his opponent has expended much of his energy in trying to get past his guard, when he repeats the sudden tactics which proved successful in the first encounter.

It sometimes happens that a third bird is spoiling for a fight with the one on the mound, but while the latter is engaged with another cock he does not interfere, though he dances round the combatants in excitement. During the battle the birds emit wild cries—a sort of hoarse shriek or screech.

However fiercely the fight may be raging, however excited the duellists, the approach of a Greyhen produces a temporary truce. The bird which first observes her flings himself on fluttering wings a few feet into the air, with a loud call, and in a moment all the other birds assembled are following his example and indulging in the most grotesque antics imaginable. As soon as the new-comer alights, the nearest Blackcock becomes her knight and champion, while she walks around him and pecks at imaginary grains of food in a feeble pretence of indifference. As other hens arrive the same scene of excitement is enacted; but as the season advances each hen pairs off with a particular male and always returns to him, while the other males cease to dispute for her favour.

In the early spring these tournaments take place in the evening as well as at daybreak, but there are fewer combatants, and not the same zest and 'go' about the proceedings as in the early morning.

Towards the middle of July the Blackcock loses his beautiful

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curly tail, and with it all his pride and self-assertiveness. He goes into eclipse and has no fight left in him; most of the day he remains in hiding, and when he does occasionally show himself at early dawn or in the twilight, he looks sadly.

It is not very long since Game-cocks were bred in England for fighting, and in Spain, the home of the bull-fight, cock-fights are popular amongst certain members of the lower classes to this day. In England this cruel and degrading sport was put an end to by law many years ago. The cruelty lies not in setting two birds, which by their very nature are always spoiling for a fight, face to face until one or the other is killed, but in the shameful practice of cutting their combs and wattles, plucking out the feathers from some parts of the body and cutting others short, so that the birds are deprived to a great extent of their natural means of protection.

In India, not only Game-cocks, but Bulbuls, Bustard-Quails, and other birds are trained to fight for the entertainment of their owners. The last named are particularly interesting because, contrary to the almost universal rule amongst birds, it is the *hens* that do battle, the cocks being quiet and peace-loving.

The Bustard-Quails are little birds, not much larger than our common Sparrow, and are found only in the Old World—in Africa, and from Asia through the islands as far as the Australian continent. In appearance they resemble ordinary Quails, but unlike these and the rest of the Game-birds, they have no hind-toe, and for that reason they are called *Hemipodes*. A number of species are known, but the one which is common in India and China is the little *Turnix taigoor*. Its habits are so peculiar that we will quote the exact words in which they are described by Mr. A. O. Hume, the great authority on Indian birds. He writes: "The most remarkable point in the life-history of these Bustard-Quails is the extraordinary fashion in which amongst them the position of the sexes is reversed. The females are the larger and handsomer birds. The females only

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call, the females only fight—natives say that they fight for the males, and probably this is true. What is certain is that, whereas in the case of almost all the other Game Birds it is the males alone that can be caught in spring-cages, etc., to which they are attracted by the calls of other males, and to which they come in view to fighting, in this species no males will ever come to a cage baited with a male, whereas every female within hearing rushes to a cage in which a female is confined, and if allowed to meet during the breeding-season, any two females will fight until one or other is dead, or nearly so.

“The males, and the males only, as we have now proved in numberless cases, sit upon the eggs, the females meanwhile larking about, calling and fighting, without any care for their obedient mates; and lastly, the males, and the males only, I believe, tend and are to be flushed along with the young brood. . . . Almost throughout the higher sections of the animal kingdom, you have the males fighting for the females, the females caring for the young; here, in one insignificant little group of tiny birds, you have the ladies fighting duels to preserve . . . their husbands, and the latter sitting meekly in the nursery and tending the young.” As we have seen, they are not the only birds among which the ladies do the courting, but I know of no other kind in which their masculine tendencies are quite so pronounced as in the Amazon Bustard-Quails.

At the finish of a duel between two Game-cocks, the conqueror nearly always proclaims his victory by loudly crowing. The effect of victory or defeat on the bird's character is sometimes very marked. A curious instance of this was once described in the *Spectator*. A certain young Cock was the master of all the fowls of his generation in the farmyard, and was very fond of crowing; while another Cock, a few weeks younger, never ventured to crow at all. But one evening a battle royal took place between these two, and the younger bird proved to be the victor. From that time, the character and habits of both birds

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changed completely ; the younger became bold and self-assertive, and was for ever crowing, while his senior, whom he had defeated, was not known to crow again.

The birds which are armed with leg-spurs use them by springing at their rival and striking forward. Some of the kickers have a rather similar action ; Cassowaries, for example, are wonderfully agile jumpers and very quick in giving vigorous blows with their feet, the inner toe of which is furnished with a dangerous claw. The most powerful kicker, however, is a full-grown male Ostrich, which has almost as much power of limb as a mule. Some idea of its strength may be gathered from the fact that one of these birds has been known to kick a hole in corrugated iron. When two male Ostriches are fighting, many of the adversary's blows are received on the horny breast-pad, but the sharp claws often make wounds in the breast, body, and legs, for these birds have no means of guarding. On Ostrich farms the men who deprive the birds of their plumes take the precaution of drawing a bag over the Ostrich's head before they begin to pluck him, in order to keep him quiet and prevent him from resenting the operation.

The birds which are most favoured by Nature with the means of warding off their opponents' blows are undoubtedly the fighting Ruffs. The Ruff (*Pavoncella pugnax*) is a wading-bird, and so belongs to the same order as Plovers and Snipes. In winter there is nothing very remarkable in its appearance ; it is a reddish-grey bird, darkly spotted above, and about the size of a Turtle-Dove, but with rather long, slender legs and beak. Except for its larger size, the cock-bird—to which the name of *Ruff* is more particularly applied—can scarcely be distinguished from the hen, which is known as the *Reeve*. In the early spring, however, before the commencement of the mating season, a most extraordinary transformation takes place in the appearance of the cock-bird, owing chiefly to the rapid growth of stiff feathers, between two and three inches long, below and around the throat, in the form of a frill or ruff.



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ROBBING AN OSTRICH OF ITS "PLUMES"

A scene on an ostrich farm. The great bird is driven into an enclosure, where a bag is placed over its head to prevent it from injuring the men while they are removing its beautiful feathers.

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At the same time a change equally great takes place in the bird's disposition. In his winter quarters, where he lives with his fellows in large parties, he is as gentle as the Reeve, but during the breeding-season he thoroughly establishes his specific right to his Latin name of *pugnax*. He is ready to fight about anything and everything, or about nothing at all. He fights about a mate or an insect, about the ground on which he is standing or the spot to which another has laid claim, about a sound or a breath of air. His anger is terrible. The rivals stand facing one another with the hinder portion of the body raised high and the head held low, the long, thin beak pointing, lance-like, straight forward. The ruff is expanded like a shield and almost sweeps the ground; the long feathers stand out and quiver with excitement. Then the two birds rush upon each other and make desperate thrusts with their bills; they spring and dart and leap and snap and struggle till one or both are exhausted and the duel comes to an end by mutual consent, the combatants shaking out their disordered plumage, still trembling with excitement and tossing up their heads in defiance. And what is the result of it all? The fact is, that nothing very serious ever happens despite all this violence and fury, for owing to the softness of the bill and the almost impenetrable stiffness of the broad collar, scarcely a single blow really gets home, and actual bloodshed is rare. The loss of a few feathers appears to be the greatest harm that can ever result from these heroic encounters. Sometimes one or two Reeves stand by and calmly watch the proceedings for a little while, and it is thought that they show favour to the victor; but the interest of a pair of these birds in each other is not lasting. Occasionally several couples are seen engaging at the same time in a very small area, but each bird directs all its efforts against its own adversary; their fights are strictly duels, and a general *mélée* is unknown.

Ruffs in captivity are just as pugnacious as in the wild state. Formerly, when they bred in considerable numbers in the fen-

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districts of Lincolnshire and elsewhere, they were regularly caught and fattened for the table. Montagu describes how he visited at Spalding a room where they were kept in confinement, and each bird had established a claim to a particular portion of the floor. His entrance drove some of them into their neighbours' territory, with the immediate result that many battles were provoked. He tells us, too, that in feeding the birds several dishes of food had to be placed among them at a distance from one another, the birds being so quarrelsome that they would have starved in the midst of plenty rather than have eaten all from the same dish!

The sharp spurs with which the wings of some birds are armed are clearly weapons of offence. The Spur-winged Plovers have a long spine on the point of the wing with which they strike when flying. Some of the Spur-winged Geese (*Plectropterus*) of Africa are similarly armed, and are able to deliver a blow which is not a matter to be joked about. Not long ago, a man employed at the 'Zoo' was disabled for a fortnight by a blow on the knee from one of these birds. The wings of the South American Screamers (*Palamedea* and *Chauna*) are also furnished with spurs, which they can use so effectively that a young bird but half-grown has been known to beat off a dog. Each of the two kinds of Screamers mentioned above has its own peculiar interest. *Palamedea cornuta*, which is commonly known as the Horned Screamer and has two spurs on each wing, bears on its forehead a slender 'horn' three inches long. This appendage, when erect, stands out like the horn of that mythological animal the Unicorn, but as it is quite a soft structure it appears to be intended merely for decoration.

It is to the other species, *Chauna chavaria*, however, that the chief interest attaches. This is a smaller bird than *Palamedea*, with a hanging crest of feathers in place of the curious horn, and is found in the swamps and open level country of Paraguay and Southern Brazil. The inhabitants call it *Chajá* or



RIVALS

Many male birds fight fiercely for a mate at the time of pairing.

The Tomfool, a species of Flycatcher, tries to spoil his rival's good looks by pulling out his tail-feathers. If he succeeds, he is so pleased with his trophy that he appears to forget all about its owner.

The "Fighting Ruffs" make fierce passes at each other with their long sharp bills, but are protected by the stout shield of feathers around the neck. The spectator on the right has assumed the typical sparring attitude in his excitement.

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Chaka in imitation of the very loud cry which it utters when soaring in circles at an immense height. Its nest of rushes is built with the foundation in the water, and about six eggs are laid. Now when the young are hatched, they are often removed from the nest by the inhabitants and reared; under these conditions they become very tame and much attached to man. The owners of one bird told Mr. Hudson that it had previously lived in a settlement which was destroyed by Indians, and that for weeks afterwards it wandered about until, leagues away from its last home, it discovered a house which was inhabited. It immediately settled down there on the most friendly terms with everybody except one person—a dark-skinned peon, whom it apparently connected with the Indians who had destroyed its home, and hated accordingly. The *Chaka* soon began to show a paternal interest in the broods of young chickens about the house, and was given some to take care of. The more there were, the better pleased it seemed to be, and it proved an excellent and careful nurse.

This account appears to confirm old stories of the *Chaka*, the truth of which has often been doubted, but which are accepted without question by Professor Newton. It was said that people kept the bird in a state of domestication to attend upon and protect their poultry, which were committed to its care in the same manner as a flock of sheep are placed in charge of a sheep-dog. During the day, it would defend them from all Birds-of-Prey, being able, by means of the spurs on its wings, to drive off even Vultures. It was also said never to desert its charges, and invariably to bring them all safe home at night. Perhaps there is a little exaggeration here—but there appears at least to be some reason for the name of “faithful *Jacana*” which was at one time applied to these birds. So far as I am aware, there is no other bird whose physical prowess has been made use of by man in a similar way.

The “faithful *Jacana*” of the older writers is not to be con-

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fused with the Indian Jacana (*Hydrophasianus chirurgus*) whose home is in India, Ceylon, and China. This bird is a most strange-looking creature and is a favourite subject for the drawings of Chinese artists. It has a long, slender, flowing tail, and the first and fourth primary wing-feathers end in peculiar filaments; but the most curious part of the bird is the foot. The claws (which are turned upward) and toes are of extraordinary length—far longer even than those of the Megapodes; on this account the birds can walk with ease on the leaves of water-lilies and other plants which grow in rivers and lakes. During the breeding season each wing bears a carpal spur, but before the winter this weapon is shed, to be renewed again early in the following spring. When fighting, they seize each other with the bill and strike out with the armed points of both wings at once.

If we have written at somewhat considerable length about the spur-winged birds, it is because they nearly all happen to possess some other peculiar characteristic which makes them exceptionally interesting. So it is with one other species to which we must devote a few lines—the North Island Woodhen or Weka-Rail (*Ocydromus earli*) of New Zealand. This is one of the small number of birds which has lost the power of flight, and is also interesting on account of its rat-like swiftness in running; but what we are concerned with now is its extraordinarily pugnacious character. In its natural haunts the bird is difficult to observe, for during the day it generally lies hidden, and is at all times so shy that, in spite of its loud, shrill cry, it is almost impossible to discover it without the help of a dog. It has, however, been carefully studied in captivity. When caged, the sight of a red cloth arouses its anger as it does that of a bull, and the introduction of another Weka generally results in a fight to the death, the two birds buffeting each other with their spiked wings—which, strange to say, though useless for flight are of ample size—until one or the other succumbs. A Weka mentioned by Buller, in his book on New Zealand birds, used to

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fight violently with its own reflection when a looking-glass was put in the cage.

Let us now turn to a few of the birds with which everybody is more or less familiar, such as Pigeons, Ducks, Parrots, Ravens, Dabchicks, and Moorhens, and learn something of their methods of conducting a quarrel.

Pigeons and Ducks have no special weapons, and none at all that are capable of inflicting a very severe injury. In their sparring they use the beak to a certain extent, especially at first, but it is employed chiefly for holding while they strike with the wings. An extinct relative of the Pigeon, the Solitaire, had a bony knob at the bend of the wing which no doubt served as a sort of knuckle-duster, and made its blows far more effective, if we may judge from the evidence of the skeletons which have been dug up, in which many bones had evidently been broken during life.

Robins, which are regarded with so much favour and affection, share with Ravens the unamiable characteristic of fighting with their offspring for the possession of territory, with the result that the young birds are usually driven out. A fight between Robins has been known to last a whole day, one of the birds eventually being killed; in both species, indeed, the battles often end fatally. Both bill and feet are used, the latter to guard or hold off the adversary, or to keep him in chancery while the bill is brought into play. The blows are aimed at the top of the head, and occasionally a single, well-directed peck is sufficient to produce a fatal result. The wings are not used at all for striking or guarding. Ravens, Crows, and Rooks all follow very similar tactics in their encounters. When two Rooks are in a pugnacious mood, they lower their heads and raise and spread their tails, repeating the movement several times. Then the combatants jump suddenly at one another, each of them trying to get the upper position and strike his opponent down. After one or two darts they pause while they eye each other warily, their bills advanced and almost touching.

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Many of the short-billed Finches try to bite their opponent's feet, which are usually very sensitive. Parrots, which also guard with their feet, are particularly apt to do this, and can inflict very severe bites with their powerful beaks.

The mention of this method of warfare reminds me of an amusing story told by Mr. Hudson of a pair of Dabchicks which nested twelve years ago on the small pond in Clissold Park. The pond was already occupied by Moorhens and Swans, which for some reason objected to their small neighbours setting up house there and repeatedly destroyed their nest. The tiny Dabchick had, however, an ingenious way of resenting the interference of the big, bullying Swan. When the nest was begun in deep water and the Swans swam towards it, the Dabchick used to dive and nibble at the great birds' feet under water. Time after time the Swans were driven off in discomfort by this amusing strategy, and we should like to be able to say that so much courage and ingenuity was at last rewarded, and that the plucky little birds were left in peace and brought up a large family and lived happily ever afterwards. But nature-stories have not always fairy-tale endings, and so it was in this case, for at length the Dabchicks were conquered by superior strength and had to abandon their efforts to establish a home.

Moorhens sometimes share with Robins and Ravens, and many other birds besides, the habit of driving away their young when they are of an age to look after themselves. Bishop Stanley, in his account of some Moorhens which frequented a moat and used to rear three broods in the season, says that on the appearance of the third brood the parents invariably drove the first family away to a neighbouring pond, where they remained until September. At that time the last hatch was about half grown, and there arrived on the moat a fresh party of birds which, from their tameness, was evidently composed of broods formerly bred there; the united families then lived in harmony until the following spring, when the original pair

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used to drive all the rest away. This was only accomplished after severe contests which often took place in the water. Their manner of fighting was peculiar: the combatants used to throw themselves on their rumps and strike at each other with their feet. When either of the birds felt that his opponent was getting the better of the duel, he dived and eluded further punishment by keeping his whole body submerged in the water of the moat, exposing only his beak for breathing.

In the wild state Birds-of-Prey invariably carry on their duels in the air, each bird endeavouring to strike the other with its talons. Their method is the same as when hunting their prey; the bird which is attacking soars above its adversary and then dashes down upon it at a great speed in order to strike it from above. The 'stoop,' as it is called, often fails owing to the skill with which the lower bird swerves at the critical moment. Sometimes, however, when escape in this way is not possible, Kites adopt the plan of turning right over when about to be struck, and the two birds grapple and come to earth together.

There is a well-known painting by Landseer, which you may have seen, representing a party of Eagles attacking a Swannery. The scene is an impossible one for several reasons. In the first place, so many Eagles would not be seen together, for they would never tolerate one another's presence in the neighbourhood of the same hunting-ground. They would certainly not attack with their bills: they never do, but *always* strike with their talons. And lastly, they would not venture to engage with a party of Swans, for, as we have already mentioned, these birds can deliver terrible blows with their wings, and it is quite likely that the Eagle would fare no better than the Swan in such an encounter. When Landseer painted a picture of a sheep-dog or a stag he painted something that he knew; when he painted Eagles he tried to imagine something that he had never seen, and he failed. Unfortunately, many pictures of

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bird-life are just as untrue to nature because the artist has cared only about making his picture interesting.

To go almost from one extreme to another, we find amongst the many birds which carry on their combats in the air such tiny creatures as the Humming-birds. The Todies or Flat-bills—bright-plumaged birds no larger than some of the Humming-birds—have the same habit. One species, the *Todus dominicensis* of Haiti, is of a singularly pugnacious disposition, and the birds are constantly fighting amongst themselves. Often two of them meet in the air, lock their flat bills together, and whirl round and round until they strike the ground, when, after a little sparring, one admits defeat by taking to flight.

Occasionally birds have been known to take upon themselves the rôle of policeman by interfering to put a stop to assaults of other birds or generally to keep the peace. Jesse relates that a Carrion-Crow, a Magpie, and a Starling were observed in a sort of rough-and-tumble fight in a meadow near Worcester. The Crow was making determined efforts to destroy the Starling, but the Magpie was heroically doing its best to defend the smaller bird and to drive the aggressor away. The Crow, however, was getting the better of the encounter, when they were interrupted and the two chief combatants driven off, the Magpie "loud clamouring at the wrong" and abusing the Crow in unmistakable terms, leaving the Starling gasping on its back with a broken wing.

A more remarkable instance was that of a Violaceous Hornbill (*Buceros violaceus*), which was kept in a menagerie at the Cape. The Hornbills are grotesque-looking birds with prominent eyelashes and huge bills, curved and pointed, and surmounted by a strange horn-like excrescence, called by naturalists the *epithema*. For the most part they are large and clumsy in their movements, hopping about after the manner of a Crow. The Violaceous Hornbill, which is a native of Ceylon, is, however, rather more nimble than some other species, and the particular individual which was kept in the menagerie used to

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pursue and catch without difficulty both rats and mice, which it swallowed whole after rubbing them in its bill. The bird, according to Shaw, "was a general peace-maker in the menagery, and whenever a quarrel arose among any of the other birds, it immediately ran to them, and by the strokes of its beak enforced a suspension of hostilities. It even kept the larger birds in awe, and Levaillant once saw it cause an Ostrich to run away with all its speed, pursuing it half flying and half running. In short it became the formidable tyrant of the whole menagery, which it imposed upon by the size of its enormous bill rather than by any genuine power; thus proving the general truth, that appearance alone often proves a successful substitute for reality." The great bills of these birds are, indeed, by no means so terrible as they appear, for if the bird be allowed to use all its endeavours to bite a man's hand it fails to cause any real pain. We are aware of no practical use which is served by them, and it seems as though in this instance, as she so often does, Nature had merely realised the importance of "a swashing and a martial outside."

CHAPTER XI

BIRDS AT THEIR TOILET

Importance of the toilet—Perils of neglect—Dry-cleaning—The city Sparrow—Choice of a toilet-powder—The tepid sand-bath—Preparing the bath—Hens and Partridges—Wood ashes—The enterprising Sparrow again—A bath-tub for city birds—Health and cleanliness—A shy bather—Drying—Bath-time—Owls—A cold tub—Preening—Masculine vanity, and feminine—The Six-plumed Paradise-bird—How the Motmot shapes its tail—Humming-birds—Swallows—Plunge-baths—Bathing in dew—Shower-baths—Parrots and their bathing parties—Water-birds—Salt water *v.* fresh—‘Brilliantine’—The uses of oil—The importance of neatness—Oiling the feathers—Brush and comb—Powder-downs—Humble servitors.

WE cannot long pay attention to the habits of animals in their ordinary, everyday life without noticing that most of the furred and feathered kinds devote a great deal of care to their toilet, and derive much pleasure and satisfaction from keeping themselves clean and tidy. In captivity—at the ‘Zoo,’ for instance—some animals appear to find in their toilet an unfailing source of diversion when they grow weary of watching the tiresome creatures who loiter in front of their cages and stare at them in such an annoying manner; but even they would hardly be so zealous and persevering, however greatly they might be ‘bored’ by the long and uneventful days, if they did not regard the occupation as an agreeable one.

Now I think we shall not often be mistaken if we say that whatever an animal takes pleasure in doing is in some way or other very important either for its own welfare or that of its kind. It is, at all events, quite easy for us to understand the importance of an animal’s toilet, and it is especially

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easy in the case of birds. It is hardly too much to say that the life of most birds from day to day, and almost from hour to hour, depends upon their power of flight, and therefore upon their feathers. The Eagle would find it difficult to hunt down its prey, the Flycatcher to catch on the wing the multitude of insects which are necessary for its daily food, the Humming-bird to probe with its bill the blossoms in which it finds materials for a meal, if their feathers were not in good order. For the swimmers and divers the condition of their plumage is of no less importance, as we shall see presently. The vegetarians must be able to flit actively amongst the trees and bushes, or to and from the fields of grain; and so with other kinds, excepting only the runners, which go to work in a different manner.

There are, besides, other things to be taken into account: the health of a bird may suffer from the attacks of troublesome parasites; and again, if its power of flight be not quite perfect, it more easily falls a prey to cats, weasels, and the many enemies of its own race which are always on the look-out for a victim. For these and other reasons attention to the toilet is of the greatest importance, and we will now consider how various birds perform this duty.

There are several ways in which birds clean their feathers, and the two chief methods are well known to everybody. The one which is most commonly seen, because it is constantly practised by the most familiar of all birds—Sparrows and Hens—is a sort of dry-cleaning process, namely, the dust-bath. The cleansing properties of ‘dust’ are very great. For many centuries the substance known as fuller’s earth, which is nothing more than a peculiar kind of clay dried and finely powdered, has been used for cleansing cloth. This, of course, is well known; but few people are aware that man himself sometimes indulges in dust-baths. The Mohammedans are required by their religion to perform ablutions at certain times every day, and they are very careful to carry out this ceremony—

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though, as I have often observed, it is not always performed very thoroughly according to our ideas of ablution. Still, a good Mohammedan would be very unhappy if he did not obey the commands of the Prophet; but what is he to do when he is in the desert, where there is no water? Like the Hens and Sparrows of our farmyards and cities, he resorts to the 'dry-cleaning' process, and uses sand instead of water.

Now let us see how birds take their dust-baths. Any day when the roadway is dry and dusty, especially in hot, sunny weather, you may from time to time see a Sparrow fly down to some spot—a little hollow worn by the traffic, a rut, or the hole left by a horse's hoof in wet weather—where the dust is fairly thick, and sinking down upon it, puff out its feathers, droop and flutter its wings, depress its tail, flirt the dust about its head with little jerky, digging movements of the bill, pause, turn round and round, ruffle and shake again, and finally, after a little further fluttering, to free its plumage of the dust, fly away. Sometimes half a dozen Sparrows may be seen close together, all taking their dust-bath in company and chirping happily to one another, until they drop out of the party one by one to resume their busy flittings to and fro. The bath may be quite a lengthy ceremony. I have just observed a little bathing-party outside my window; there were seven or eight birds most of the time, but the company was changing continually, some birds leaving at short intervals and fresh arrivals taking their place. The majority remained about two or three minutes, some longer, while others took only a hurried 'dip' and went away again. Sparrows generally choose the driest and finest dust they can find, ground to powder by passing wheels, though on damp days they still manage to enjoy themselves in the sand which has been washed by rain to the side of the road, provided it be not too wet.

Other birds have other tastes. In the early morning, if you take a walk along a road over downs, moorland, or through wide pastures, you may occasionally come upon a Skylark dust-

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ing in some little hollow of the surface ; he for his part prefers a coarser, more gritty powder than our neighbour the Sparrow, and is most often to be seen taking his bath in a little collection of sand, the finer parts of which have been washed away by rain or winnowed by the wind. Often, too, he may be observed on a bare, dry, sandy patch on the fields or common, crouching low, lying on his side, shaking his wings or his whole body, and thoroughly dusting all his feathers to cleanse them. I have seen a Nightjar behaving in a similar manner, but he was taking his bath in the evening, at dusk, before setting out on his wonderful, mazy flight in pursuit of moths and chafers. That was in a field beside a beech wood, at a spot from which a few pieces of turf had been cut, leaving a shallow hole half filled with drifted sand. In America, the Whip-poor-will, a near relation of our Nightjar, is said to have, on sandy roads, its favourite bathing-spots, to which it resorts for frequent sand-baths. Another kind of bird which I have often observed in little dusting-parties by the side of a road which runs over the ridge of a moor is the Grouse ; it has always been in the noontide hours that I have seen them, and I imagine that, like many Game-birds, they like their sand-baths warm, or at least ‘with the chill off.’

The ordinary domestic Fowl and many of its relatives make special preparations for the bath by scratching a hollow in the dry ground and breaking up the earth into fine dust before crouching down into it. Partridges are very thorough in this method of dusting. They find a place where the ground is free from grass or other vegetation and the soil is dry, and there they scratch a shallow hole. When the earth is sufficiently pulverised to suit their taste, they shuffle backwards in the dust in a curious manner, until their feathers are everywhere full of it, fluttering and ruffling their plumage in the most energetic way with keen enjoyment. I am informed that wood ashes are occasionally employed for scouring and cleansing, and it is interesting to find that birds appreciate

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the efficacy of this particular toilet-powder, and take advantage—especially in rainy weather when dry earth is difficult to find—of any little heap of ashes left by a bonfire.

Though the devotees of the dust-bath are very numerous, the majority of birds prefer to wash in water, and many kinds are most assiduous bathers. Very many ‘dusters’ never wash, but there are not a few exceptions to the rule, and the Sparrow is one of them. In spite of his plebeian habits, he is in many ways a luxurious little creature, and few of the simpler methods of enjoyment practised by birds have escaped his enterprising mind. He has never learnt to perform elaborate flight-dances, and but few of his species ever utter a true song, but in matters requiring no great skill the Sparrow is as good a bird as any of them—perhaps better—or he would not be so extraordinarily successful in life. The Sparrow, then, though he takes his dust-bath as a matter of course, and enjoys it too, is fond of a water-bath when he can get it, which in a big town is not, perhaps, as often as he would like. If you will put some clean water in a shallow dish or tray, and place it in a convenient situation (out of the reach of cats) you will soon find by the altered appearance of the water how greatly your thoughtfulness has been appreciated—and how inadequate as a cleansing agent is the dust of a city street, when assiduous ‘dusters’ like the Sparrows leave behind them such unmistakable evidence of having made use of the tub you have provided for them.

Those who have aviaries, and those who keep their so-called ‘pet’ birds imprisoned in miserable little cages, know—or should know—how thoroughly almost every kind of perching bird revels in an occasional bath. Some species cannot be kept in good health, in captivity, without it; for Hawks and other Birds-of-Prey the bath is essential; and in the old days, when Zoological Gardens were not so well managed as they are now, there is no doubt that many valuable and interesting birds died from the lack of a bathing-place. Whether

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they bathe as regularly in their natural, free, wild condition we do not know, for they are shy and not easy to observe, but there is no reason to suppose that they do not.

The bath of a trained Falcon, kept for hawking, such as a Peregrine (the king of them all), is interesting to watch, but to observe it in its perfection, or to observe it at all in the case of a young bird, or one which has not been thoroughly trained, the spectator must be hidden—otherwise the bird will probably sulk on her perch, for those who keep Hawks inform me that at no time are they so shy as when bathing. Descending from her block, the Falcon steps cautiously and deliberately into the shallow pan of water, not without many careful glances around. If satisfied that she is in no danger of being interfered with, down she stoops, and dipping her broad, flat head under the surface, tosses the water over her back, ruffling her feathers meanwhile, so that her plumage becomes thoroughly soaked. Wings and tail are spread and folded rapidly until they too are well cleansed, and a final energetic flutter, which scatters a shower of sparkling drops all around, completes the bath. Her care then is to dry her feathers as quickly as possible. She flies up to her perch or block, and rests there, if possible, with her back exposed to the sun, her wings and tail half open, and all her feathers raised so as to allow the air to penetrate amongst them and hasten the evaporation of the moisture. The drying is further assisted by the occasional stretching of a wing or a general shake of all the feathers, and I take it as an instance of Shakespeare's keen and exact observation when he makes Sir Richard Vernon compare the trembling plumes of "the nimble-footed madcap" Prince of Wales and his comrades to the "baiting" or fluttering of Eagles, "having lately bathed."

Though the bath may be taken at any hour of the day, different birds seem to prefer different times. The Sparrow likes an early morning tub, but washes and dusts at all hours: the Robin, on the other hand, generally bathes in the evening

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before going to bed, and often when most other birds have already retired to roost. With Blackbirds and Thrushes noon is the fashionable hour; but there is no hard and fast rule in any case, and these are merely the times when, broadly speaking, the birds are most frequently to be seen bathing. Some of the Finches appear very rarely to take a water-bath at all: they prefer a dry shampoo with sand.

Many of the Owls, such as the Screech-Owls (*Scops asio*), are cleanly in their habits, and very fond of bathing; there are species, however, which live far from the neighbourhood of water, and in their case a regular tub is clearly out of the question; they must either dust, or they must bathe in dew—a dainty habit which is possessed by certain other birds, as we shall see presently. Some years ago Mr. Frank Bolles gave a delightful account of two Barred Owls which he kept in captivity. The title by which these birds are known to ornithologists is *Syrnium nebulosum*, but Mr. Bolles Owls were usually called by the more familiar names of “Fluffy” and “Puffy.” He says: “They not only drank water freely, but took prolonged baths whenever fresh water was given them. Their tank was one foot and a half long, a foot wide, and ten inches deep. Their reflection in this comparatively deep and dark pool greatly amused them for a time. On the arrival of fresh water Fluffy was usually the first at the brink, ready to drink several times, and then to step cautiously in. He would test the depth before ducking his head, and then, holding out his wings, he would pump the water under them, flapping his tail and otherwise drenching himself. When thus soaked he became about the size of a plucked Pigeon, the colour of a Crow, and a dismal object to look upon. His eyes at such times would stand out from his drenched and drizzling feathers in a most unpleasant way. This habit of bathing has been maintained in all weathers and temperatures. I have seen both birds take their plunges on mornings when the mercury outdoors was not more than

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10° F. On such occasions they shiver for hours before drying. After washing, it is their habit to preen each feather in their wings and tails with great care and precision."

Preening the feathers is a most important part of a bird's toilet; it is practised not only after the bath, but at frequent intervals, as occasion requires, throughout the day. The plumage is arranged by means of the bill, the feathers being pushed, pressed, dragged, and teased into their proper places, and sometimes further smoothed and pressed down with the help of the throat and neck. Individual feathers—especially in the highly decorated species—receive special attention, and are drawn through the bill to clean away every speck of dust and put the web in order. This is very noticeable in the case of those gaily-clad creatures, the Paradise-birds. They cannot endure that a feather should be out of place, or that a single speck should mar the exquisite beauty of their plumage. When perched upon a bough, the male Paradise-bird—for he alone has the fine feathers—is constantly spreading his wings or tail and taking sidelong glances at his beautiful plumage. There are no bounds to his admiration of his own good looks; there is no limit to his industry in making himself appear to the best advantage. Those species which have soft, spreading side-plumes draw them gently through the bill and shake them lightly out, touch and retouch, arrange and rearrange, until their fastidious taste is satisfied, when they bound to and fro in the exuberance of their vanity, eager to display their wondrous charms. All this activity naturally displaces a feather here and there and the birds find it necessary, after showing off, to make themselves tidy again. But what of that? They love to do it, and, like some other vain bipeds, they seem never to weary of the labour of arranging their fine clothes.

So far as I have been able to ascertain, the Paradise-birds take dust-baths in much the same way as the Game-birds up to a certain point, but with little eccentricities of their own

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which are quite in keeping with their remarkable appearance and peculiar habits. We may take as an example the beautiful and wonderful Six-plumed Paradise-bird (*Parotia searpennis*). You have probably seen the skin of one of these birds, horribly mutilated and deformed, bereft of all its grace, but still retaining much of its glorious colouring and the six curious racket-shaped feathers from which it derives its name—you have probably seen one, distorted, alas! almost beyond recognition, attached to a lady's hat, for this is one of the rare and beautiful creatures which are being killed wherever and whenever they can be found, and exterminated as rapidly as possible, for the satisfaction of human vanity. There is something almost grotesque and laughable about the vanity of the gorgeous Paradise-bird; but his fine feathers are at all events his own. There would be something far more laughable, as it is infinitely more grotesque, about the vanity of those who wear it dead, if only it were not overshadowed by the meanness of destroying what is most beautiful on earth to satisfy a whim.

It is not with the Six-plumed Paradise-bird dead that we are concerned, however, but with a joyous, shining creature, full of life and energy, moving from tree to tree in the depth of a forest, and uttering his loud, harsh cry; for though he is very lovely to look upon, his voice is not by any means beautiful. Even a Paradise-bird is not *quite* perfect. To clean his rich plumage, this strange bird scrapes a round place clear of leaves and grass, at some spot where the earth is dry, and so prepares a dust-bath like any gallinaceous bird. But he is not content to crouch and flutter his feathers in the dust as most birds are, for Signor d'Albertis tells us that he rolls over and over with loud cries, ruffling and flapping, raising his bright silvery crest, extending his six remarkable battledore feathers, and behaving altogether in such an eccentric manner that you would suppose he was engaged in a conflict with some imaginary enemy.

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Many species of birds besides this Paradise-bird are the possessors of battledore or racket feathers, and some of them, the Motmots, owe this form of decoration entirely to their own enterprise. The Motmots are allied to the Kingfishers, and are found in certain parts of Central America and over nearly the whole of the Southern continent. Though less gaily clothed than many of their near relations, they are handsome birds with lustrous greenish or bluish plumage; the most striking thing about them, however, is the presence of two long racket feathers in the middle of the tail. If these feathers be carefully examined, and the bare shaft above the racket drawn between finger and thumb, it will be found that the sides of the shaft are rough, like a file. Now the long shaft of a racket feather is usually smooth—as smooth as a quill; and this peculiar roughness is rather suggestive of a feather from which the barbs have been broken. That, in fact, is really the case, for the *young* Motmot has the middle feathers of the tail of quite an ordinary kind, with a complete web on each side, and it actually nibbles off part of the web and trims the feathers into the fashionable racket shape! This extraordinary habit, which is perhaps quite unique amongst birds, was reported long ago by Waterton, but few people believed it possible until some years later, when the report was shown beyond doubt to be a true one. Even now nobody has been able to offer any explanation as to how the habit of tail-trimming arose. As the middle feathers are not at first longer than the others, the young Motmot sometimes makes a mistake and begins to trim the wrong ones, until the central pair develop further and he corrects his error as far as possible by nibbling those, though he cannot of course replace the pieces chipped out. The Motmot's beak has saw-like edges which may be helpful in the trimming process. I lately saw the skin of one of these birds in which the tail had hardly been trimmed at all, and found that this was due to some old injury to the beak which prevented the edges from meeting properly, so that it was no use for cutting. The

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Motmot is justifiably proud of his work and sits for long periods at rest on a bough, swinging his tail from side to side like the pendulum of a clock.

To return now to the subject of bathing: even more dainty and gem-like than the Paradise-birds—and not less persecuted on account of their beauty—are the Humming-birds; but their toilet methods are more in keeping with the exquisite splendour of their plumage. They bathe very frequently, and often resort, at all times of the day, to a brook with little pools of clear water, among the trees. Their favourite bathing-time, however, is the evening, during the brief tropical twilight, when several birds may often be seen hovering together over the same tiny pool, turning from side to side with quick, jerky movements of the tail, their ceaseless flitting to and fro displaying in a wonderful way the gleaming, gem-like radiance of the feathers; one moment, it may be, flashing like an emerald, the next glowing like an amethyst, and then, most wonderful of all, dipping an instant beneath the surface and reappearing with a flash to throw off a tiny shower of glittering spray before retiring to a favourite twig to preen their feathers. That, however, is but one of the methods of bathing practised by Humming-birds—a method which they share in common with our own Swallows and the Drongos or King-Crows of India, which may be seen, as they skim over the water, dipping into a pool time after time in the course of their flight. Drongos, Swallows, and Humming-birds alike appear to be able to perform nearly all the functions of everyday life while on the wing. House-Martins and Sand-Martins, which ought never to be, but often are, mistaken for Swallows, have not quite the same perfect power of flight, and do not often wash while on the wing, though they may occasionally be seen ‘dipping’ in very-hot weather.

But to return to the Humming-birds. The Broad-tailed Hummer (*Selasphorus platycerus*) is one of those enthusiasts who wake early and go to bathe at daybreak, however cold,

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and even frosty, the weather may be. Dr. Merriam describes how they may be seen at their bathing-place in such numbers as to remind one of a swarm of bees buzzing round the head of an intruder and darting hither and thither until the air appears to be full of them. In the midst of their flight they drop down to the water, dip their feet and bellies, and spring up again as suddenly as if propelled by some unseen mechanism. There is something which is wonderfully attractive about these sudden little plunge-baths taken in the midst of rapid flight; but we have not yet come to the end of the Humming-birds' dainty methods of performing their toilet. Perhaps the most idyllic of them all is that observed by Wallace, in the island of Mexiana, on the Equator. On approaching a tree near the house in which he was staying, he found a multitude of blue-and-green Sabre-winged Humming-birds (*Campylopterus*), with long forked tails, fluttering amongst the foliage. The leaves were wet with dew, and the little birds appeared to be washing and cooling themselves with the moisture. Shower-baths, too, are much appreciated by the commoner species of Humming-birds which are seen in gardens, for they have frequently been observed flying to and fro through the spray of a fountain.

Fountains, however, are not found everywhere, and few birds would be able to enjoy the luxury of a shower-bath if they had to depend on such artificial appliances. But Nature provides a shower-bath for all, in most of the regions inhabited by birds: the most perfect of all shower-baths, rain.

Now there are birds which dislike rain almost as much as their hereditary enemies the cats dislike it; some, on the other hand, delight in it. I have noticed that the birds which habitually indulge in what we may call a plunge-bath, seem to find it most enjoyable of all when it is combined with a shower; and during a rain-storm, especially after a spell of fine weather, great numbers of feathered bathers take advantage of the opportunity. Amongst the rain-loving species we find birds as widely different as Ducks and Parrots. During the progress of

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a heavy tropical rain-storm, when the air is almost darkened, Parrots may frequently be seen sitting motionless at the very summit of a tree, on dead branches devoid of foliage, allowing the water to stream over them, and uttering cheerful screams of enjoyment. They might easily find shelter amidst the thick boughs and dense foliage below them, but they prefer to expose themselves to the shower, though in fine weather they keep under cover. As soon as the rain has ceased, however, they appear just as eager to get dry again.

Parrots very quickly become drenched with moisture, and they are absolutely incapable of swimming. I recollect one which fell overboard from a steamer off Durban, and its utter helplessness in the water, where it was drowned before any attempt could be made to rescue it. This bird had been the last survivor of an unfortunate company, for several others, all of them of the Grey African kind, which had been taken on board at Las Palmas, sickened and died during the course of the short voyage, and I found that they were all victims of tubercular disease. Whether Parrots are subject to this scourge in their wild state, or only in confinement, I do not know. But to return to the subject of bathing; though Parrots are apparently so ill-adapted to aquatic games, they often form great bathing parties and play about in the water until their plumage is soaked through. The Damask Parrot (*Psittacus infuscatus*), which, like the Grey Parrot, is an African species, forms such parties twice daily, after the morning and evening meals. According to Levaillant, all the Parrots of the district meet together and repair, with much noise, to the bathing-place, which may be situated a considerable distance away, for none but limpid water will satisfy their fastidious tastes. On their arrival, they are to be seen rolling and tumbling over one another in the utmost confusion on the banks, dipping their heads and wings, scattering drops of water in glistening showers over all their plumage, and thoroughly enjoying the frolic. When they have finished

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bathing they return to the dead trees which form their meeting-place, and finish their toilet by adjusting and preening their feathers. The birds then fly off in pairs, and the party breaks up until the next morning, when they all forgather once more to dry their dew-drenched plumage in the first rays of the sun. It is mentioned above that the Parrots have for their place of meeting a number of dead trees. I believe that the trees are often killed by the Parrots themselves, which bite off all the buds and leaves and strip the branches quite bare, as they have done in the great aviary at the 'Zoo.'

Parrots sometimes indulge in dust-baths, and enjoy playing in sand. In wet weather and in districts where dry sand is difficult to find, they have been known to creep into Kingfishers' burrows in search of dust.

There is an old tradition that when a 'busman lays aside his whip for a few hours and takes a holiday, he usually spends the day as a passenger on a comrade's 'bus. One is reminded of this by the circumstance that when swimming and diving birds are not engaged in paddling about on the surface of the water, or diving for their food, many of them devote a good deal of time to bathing! That it should be necessary for such birds to take special baths is one of those unexpected things in Nature that nobody would be in the least likely to foresee, and it is a striking proof of the importance to a bird of careful attention to its toilet. Both Ducks and diving birds seem to prefer a shower-bath to any other; Wild Ducks, for instance, may be seen in heavy rain ruffling their feathers and allowing the drops to penetrate until their plumage is thoroughly soaked; and those curious and most skilful fishers, the Snake-birds (*Plotus anhinga*), which derive their name from their remarkable habit of swimming with the body wholly submerged and nothing but the thin, snaky neck and slender head raised above the surface, are equally fond of a shower. When sleeping, they stand on branches of trees over the water, a few yards apart, the torpedo-like body almost erect, and the

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head snugly tucked away beneath the 'scapulars.' So great is their enjoyment of a shower-bath that in rainy weather they may remain roosted nearly the whole day, standing quite still with the head and neck stretched up towards the sky, allowing the water to run over them, with an occasional violent ruffle and shake of their dark, green-glossed plumage.

The cleansing properties of salt water are by no means equal to those of fresh river-water, and this may account for the fact that Gulls and other sea-birds like a fresh-water bath occasionally. Mr. Kearton believes that fresh water has the very desirable effect of killing the parasites which live amongst their feathers. In the island of Unst he noticed that after washing in fresh water the Gulls shake their plumage while on the wing and then make their way to a hill-side, where they sit facing the wind while they put their feathers in order. It has been observed that Penguins—not those which make their home in the ice-region, for in their case it would be impossible—usually choose for their breeding-ground some situation in the neighbourhood of fresh water, in which they delight to bathe. Though they are ill-adapted for travelling on land, they occasionally put up with the inconvenience of a long journey to and from the sea if they can find a suitable boulder-strewn slope near a stream whereon to make their home.

We have yet to mention what is generally supposed to be quite the most important part of a water-bird's toilet. Everybody, or almost everybody, must at some time or other have seen a Duck preening its feathers, and will certainly have noticed that now and then it presses its bill just over the root of its tail and afterwards rubs it over its feathers. If you will turn aside the feathers on a Duck's back, just over the root of the tail, you will find a little patch where the skin is raised into a low mound, and if you examine this very carefully you will see two tiny openings. This is a most precious possession of the Duck, for it is the source from which the bird obtains an unfailing supply of oil where-

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with to oil its feathers. We all know that oil and water will not mingle—that water runs rapidly from an oily surface—runs, in fact, “like water from a duck’s back,” which is only another way of expressing the same meaning, for the Duck sees to it that his back, and all the rest of his body surface for that matter, is an “oily surface.” The advantage of this arrangement as a means of preventing water from penetrating the plumage when the bird is swimming and diving is obvious; but it is not the only means, as we shall see presently. If the water had access to the feathers it would interfere very much with the bird’s success as a swimmer; the whole plumage would become soaked and water-logged, and its buoyancy would be diminished, for the air amongst the feathers is of great assistance in keeping the body afloat high in the water; and as an air-jacket is also the very best means of preventing loss of heat, the bird’s body is kept warm, however long it may remain afloat. An oily surface, moreover, enables the bird to pass more easily through the water, by diminishing the amount of friction. In recent attempts to swim the Channel, it has been the habit of at least one famous swimmer carefully to oil his body all over before entering the sea, thus taking a lesson from the Ducks.

It is not enough that the feathers should be well oiled, however; if the water is to be kept out of the plumage, the feathers which cover the surface—the contour-feathers, as they are called—must all be in good order, smooth, close, and compact, for if any are broken or disarranged a leak is established, and however oily the plumage may be, the unfortunate bird soon becomes soaked to the skin.

That excellent naturalist, Mr. St. John, believed that the imperviousness to wet of the plumage of wild-fowl is entirely due to the manner in which the feathers are placed. In one of his interesting books he says: “As long as a wild duck of any kind is alive, his skin remains perfectly dry, though in the water, and although, from the situation in which he may be

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placed—being pursued, for instance—it is quite impossible for him to find time to ‘oil his plumage,’ . . . but the moment a duck or water fowl is dead the water penetrates thro’ the feathers, wetting the animal completely. If one wing is broken the feathers of that wing immediately become soaked with wet, the bird not having the power of keeping the feathers of the broken part in proper position to resist the entry of the water. We all know that birds are able to elevate, depress, and, in fact, to move their feathers in any direction by a muscular contraction of the skin. When this power ceases, the feathers hang loosely in every direction, and the wet enters to the skin.” There is no doubt, however, that greasy feathers do count for a great deal. Birds which do not possess them very quickly become “wet to the skin” if they happen to fall into the water, however well groomed they may be; and if you will take two of the feathers of a Duck’s breast and ask your friend the doctor to remove all the oil from one of them by washing it in ether, and if you will then dip them both in cold water for a moment, you will see for yourself which of the two is wetted more readily.

Now all this shows how *very* important it is for swimming birds to keep their feathers perfectly tidy, as well as thoroughly oiled, and they behave as though they were quite well aware of it, for they are even more attentive to their toilet than the land-birds, though most of the latter use oil too, and owe some of their beauty to the gloss which it imparts to their plumage.

In localities frequented by Cormorants it is interesting to watch those birds when they have returned from their fishing. They may be seen sitting with their wings half extended, drying themselves in the wind; that is the preliminary part of their toilet. When their plumage is dry enough to retain the oil, they squeeze a little from the gland with their beak and proceed to dress their feathers. Cormorants, as we shall learn later on, are sometimes trained for fishing, and Mr. Salvin, who

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kept these birds as well as Hawks, was able to observe their habits very closely and far more exactly than it is possible to observe them when wild, even with the aid of a good glass. He says: "After dinner, in lieu of taking a nap, they take their bath, and then, having ascended to some elevated position, they flap themselves dry, and finish their toilette by oiling their feathers from the oil gland, which I have repeatedly seen them and hawks do when upon my fist." Mr. Salvin's favourite Cormorant was named 'Old Isaac,' after Isaac Walton, in humorous allusion to its skill as a fisherman, and he goes on to say: "'Old Isaac' did this so deliberately that you could actually see the 'macassar' squeezed out; and after applying it with his bill, he rubbed it in with his throat."

One of those eccentric-looking birds, the Hornbills, uses so much oil in this way that the feathers of its neck become stained a yellow colour; but perhaps this is due to the particular kind of oil which it secretes. At all events, the 'macassar' is not quite the same in all birds, and in the Muscovy Duck and a few others it is scented.

Before taking leave of birds which pass much time in the water, we must just allude to a curious habit possessed by the Moorhen, which wrings out the water from its feathers by means of its bill.

So far we have seen that birds are endowed with accessories and aids to the toilet in the form of an oil-gland or grease-pot; the feathers of the neck, which in Ducks, Cormorants, and other birds serve as a brush; and the bill, which is used as a comb—though it must be admitted that it is an extremely simple form of that implement. A certain number of species, however, are provided with another structure, which possibly serves a similar purpose, though it may have other uses as well. In these birds, amongst which we may name the Nightjar and the Heron, the claw of the third toe is toothed, or serrated, as it is called; and as they, like many others, use their claws for scratching themselves, it is not unlikely that the

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peculiar claw is of some help in putting the feathers in order.

Hérons, Bitterns, Parrots, Tinamous, and some Hawks and other birds are the possessors of what we may perhaps refer to as powder-puffs. These are patches of remarkable down-feathers, properly known as powder-downs, which have the peculiarity of constantly crumbling away into an exceedingly fine dust. In Herons the powder-downs form four great patches, a pair on the breast and another pair over the thighs, but in some other birds they are scattered over almost the entire body. Unfortunately we do not yet understand the exact nature of this powder, nor do we know of what use it is to the bird, though it certainly helps to produce the beautiful bloom which is seen on the feathers of some Parrots and Cockatoos.

All birds, from the highest to the lowest, perform their own toilet without assistance, though it is to be remarked that the most intelligent of all (except possibly some of the Crow tribe), the Parrots, occasionally display their affection for one another by preening each other's feathers in play. Two tame American Crows, however, which belonged to Mr. Abbott M. Frazer, hit upon a very novel and efficacious method of keeping their plumage free from troublesome parasites. These knowing birds engaged a whole army of attendants to assist in the process, for they used to stand quietly on an ant-mound and allow the ants to crawl over and amongst their feathers, displaying meanwhile evident signs of satisfaction, as it was very natural that they should, for the ants quickly seized any vermin which was lurking in their plumage and carried it away. This observation may perhaps explain why it is that certain kinds of birds so frequently make their nest in a cavity hollowed out of an ant's nest. Writing of a species of Kingfisher, the *Ceyx dillwynni*, which is found in North Borneo, Dr. Sharpe says: "Often will the traveller see a small, bright yellow bird pass him in the forest like a little express train, whistling as though it were

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important to let every one know it was coming. Then suddenly the whistling ceases and the bird has perched. . . . This is one of the Bornean 'Burong angi,' or 'omen birds.'" Dr. Sharpe noticed that a nest of this bird, which contained two eggs, was swarming with ants; is it not possible that they were the toilet attendants of the little yellow Kingfisher?

CHAPTER XII

SWIMMING AND DIVING

How water-birds are kept warm and dry—The double garment of feathers—An air-cushion—The shape of diving and swimming birds—Methods of propulsion—Feet and wings—Penguins, Darters, and Cormorants—Diving as a means of escape—How do birds remain submerged?—Pursuit of the Great Northern Diver—Advantage of swimming under water—High diving of Gannets—The instinct of escape—The versatile Dipper.

NOT long ago I was watching the Ducks and Gulls on the Round Pond in Kensington Gardens. A few yards away stood a small boy, accompanied by his nurse and a dog; they also were interested in the birds—especially so the dog, which presently ran a little way into the pond, barking loudly at a Duck which had ventured within a few yards of his nose after a piece of bread which had been thrown to it. The nurse called him back, and told him he must not go into the water, because he would catch cold. “But, nurse, why don’t the Ducks catch cold?” asked the boy.

Why don’t the Ducks catch cold? Why do not Gulls catch cold? and Swans, and scores of other birds, many of which spend hours at a time on the water, some of them sleeping there even in severe frosty weather? or, again, birds which remain there constantly for many days, like the Eider-Duck? That is an interesting question.

The answer to it—or perhaps I should say, the reason why they do not find the water too cold, even in mid-winter—is as follows. In the first place, the birds never really get wet. That is rather a startling statement, but if you will consider it for a moment you will see that it is true. You will remember what

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we said about a Duck's toilet, and how it always takes great care to keep its feathers well oiled and nicely trimmed, so that the water cannot penetrate its plumage and its skin remains dry even when it spends hours on the water. Its clothing is waterproof; but it is more than that—it is thick and warm; in fact, it is a wonderful double garment of a very special kind. Under the feathers which you can see as the bird swims about, the 'contour' feathers, as they are called, because it is to them that the smooth curves and outline of its figure are due, there is a layer of soft down next to the skin.

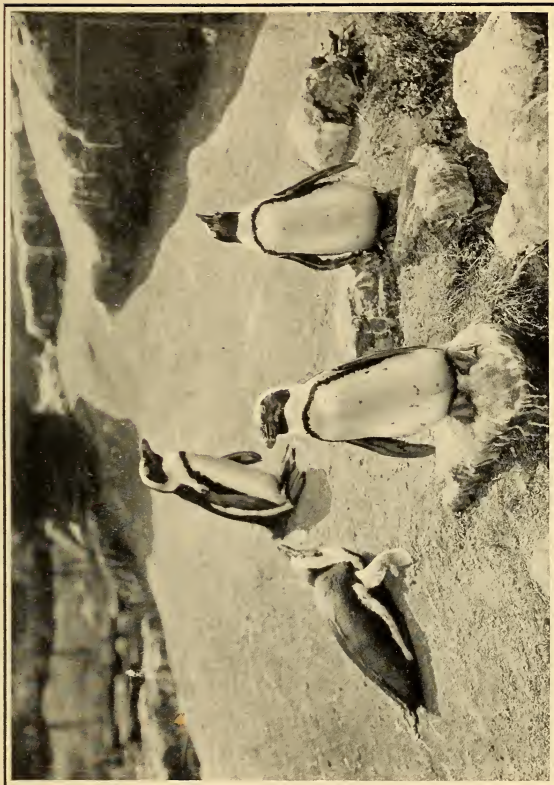
You know what swansdown is like, and how beautifully warm it is. Other birds besides Swans are clothed in a similar warm undergarment, though it may not be so thick—but that is what you would expect, because the Swan is an exceptionally large bird. The contour-feathers, then, form an oily, waterproof outer coat, beneath which is a warm, fleecy undergarment of down. The thickness varies in different parts of the body; it is usually greatest on the breast and underside, where it sometimes exceeds an inch. But this is not, of course, an inch of solid feathers; underneath the close-fitting contour-feathers there is a network of spaces filled with air, and this is very important, for two reasons—firstly because air is a bad conductor of heat, and an air-jacket is therefore almost the warmest covering we are acquainted with, except a jacket with not even air inside it, but merely an empty space or vacuum; and secondly because, being extremely light, it enables the bird to float high out of the water. Many birds, indeed, swim with their actual bodies entirely above the water, resting on what we may regard as an air-cushion cased in by the contour-feathers, their feet only being submerged. It is not surprising, therefore, that they do not suffer from the cold.

But Nature has devised yet another means of protecting them, and that is by a thick layer of fat under the skin—just as whales and other warm-blooded marine animals are kept warm by the coat of fat which is known as 'blubber.' In

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those comical birds the Penguins, which are as thoroughly at home in the water as a seal and manage to hatch their eggs on an ice-floe, the layer of blubber is at certain times of the year enormously thick.

Now let us see in what other ways birds are adapted for a life on and in the water. What about their shape, for instance—is that well adapted for swimming and diving? Let us bear in mind that air and water are both *fluids*, though one is gaseous and the other liquid; we shall then realise that a solid body which is particularly well suited by its form for moving through the one fluid is very likely to be of a suitable shape for passing easily through the other. You know what is meant when you read about the ‘lines’ of a ship; you know, too, how much importance is attached to the lines of a racing yacht—a *Shamrock*, for instance, built to compete for the America Cup, or other great race. Well, the lines of a bird are as near perfection as possible for progress through the air with the least amount of resistance, and they are equally well adapted for a liquid medium, as it is called—that is to say, for water. They are not unlike the lines of a boat, for, as in a boat, there is a pointed fore part, swelling to a curve at the sides and narrowing off again behind. Underneath, too, the resemblance still holds good, even to the name of that projecting edge of the breastbone which we call the keel. Of course all water-birds are not built on exactly the same plan, just as all boats are not precisely the same shape, much depending on the conditions of sailing or the way in which they are propelled. So we find that birds which are chiefly swimmers on the surface have different lines from birds which excel chiefly as divers or swimmers under the surface. A Duck, for example, which is an excellent swimmer but a very indifferent diver, may be compared to a lifeboat; while a Penguin, which can perform marvels under water but is a much inferior performer at the surface, rather resembles a submarine. A Guillemot is something between the two, and is equally at home on or under the water.



Photo, L. L. Holborn

A GROUP OF CAPE PENGUINS

Penguins are poor walkers, and cannot fly at all except under water, where they are quite at home. If they are in a hurry when on land they throw themselves flat on the ground and slide along, like living toboggans, using both feet and flipper-like wings to aid their progress. The illustration includes a penguin in this attitude, and the remarkably seal-like figure of the bird is well shown.

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The next question to consider is the means by which the birds propel themselves, and we find there are two—by the wings, like Auks and Penguins, or the feet, as in Ducks and Gulls. When the feet are not used as propellers, they generally seem to serve the purpose of a rudder. The best position for either of these is, of course, as near the hinder end as possible, and if you will think of all the water-birds you have ever seen, you will find that their legs are nearly always placed very much further back than in other birds. You have only to compare a Duck with a Fowl in order to see the difference. When a bird is on land, this position of the limbs produces a very clumsy effect; even a Duck walks awkwardly, but in many other birds, such as Auks, Puffins, and Penguins, whose legs are still nearer to the hinder extremity, the body has to be carried bolt upright, on end as it were, and the limbs being short, good walking becomes practically impossible. On land the Penguin moves by a series of hops, as though its feet were tied together.

The feet of swimming birds are webbed, but the toes are not in all cases so completely connected as in Ducks, Gannets, and Cormorants; there are various intermediate stages between these and the separate-toed feet of the perchers, climbers, waders, and runners. A Dabchick's toes are curiously lobed—that is to say, they are flattened out round the sides into a broad flap, but the flaps are only joined together for a little way at the beginning, so that the foot looks very much like a leaf with deep notches, such as a vine-leaf. Similarly in the Coot there are broad folds of skin round the sides of the toes, while the Moorhen's long toes have only a narrow fringe of membrane. Several birds, such as Grebes and Divers, have a flattened shank-bone, which makes the foot still more suitable for paddling.

As we have already stated, some birds use their wings instead of their feet for swimming under the water. Water, of course, offers a much firmer resistance to the wing stroke than air; a

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wing that is used for *flying under water* need not, therefore, be so large as a wing that is used for flying in the air, just as the paddle of a water-wheel need not be nearly so large as the sail of a windmill, though they are both used for the same work of grinding corn. Very large wings would be awkward to use, if not unmanageable, under water—as awkward, perhaps, as you would find it to try to swim with a tea-tray fastened to each hand. Guillemots, Razor-bills, and Puffins have to fly in both elements, and we find that in these birds the wings, though large enough to sustain them in the air, are short enough to be used with a certain amount of skill in the denser medium. But Nature has not been able to devise a wing that is *quite* perfect for both these purposes, and the birds which excel all others in sub-aqueous flight, the Penguins, are absolutely incapable of flying in the air. A Penguin's wing is a flat paddle, and quite unlike the wing of any other bird; indeed, it is far more like the flipper of one of the great marine animals. It is totally devoid of quills, and at first sight it appears as though there were no feathers at all on it. If we examine it carefully, however, we find that it is covered with little scaly-looking feathers not much unlike the scales on the bird's legs, but they are true feathers, though very degenerate ones, and as different as possible from the ordinary kind.

Ungainly as they are on land, and incapable of flight though they be in the ordinary meaning of the word, under water Penguins are most graceful performers, and as beautiful as they are graceful. The plumage gets a wonderful lustre from the silvery coat of air which clings to it when the birds dive, and which, to quote Mr. Cornish, “seems to fit them for everlasting flight in the palaces and grottoes of the sea-nymphs, across which they fly, bearing bubbles of sunlight from above, scattering them through the chambers like crystal globes of fire.” Their flight may be watched and studied in the large glass tank at the ‘Zoo,’ and it is a marvellous exhibition of skill. Hopping from its pen to the side of the water, the bird

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makes a very clumsy appearance, but the moment it has plunged below the surface it is transfigured. With short, rapid strokes of its paddle-wings it darts through the water, leaving a trail of glistening bubbles behind, and shoots forward with the speed of a fish, turning more rapidly than almost any bird of the air by strokes of the wing alone, the legs floating apparently inert in a line with the gleaming body, or giving an occasional upward kick to force it to greater depths. Fish after fish is seized and swallowed without a halt or the slightest slackening of speed, until the bird is satisfied by a final tour of the tank that none has escaped, when it scrambles out of the water and immediately becomes once more the clumsy, queer, ungraceful creature of a few minutes before. Some idea of a Penguin's pace in the sea may be obtained from the statement that the birds dart out of the water with sufficient impetus to enable them to land upon their feet on the top of an ice-floe a yard above the surface. Sometimes they leap not quite high enough, and fall back again with loud cries; but they are as persevering as salmon leaping up a waterfall, and try again and again until they succeed.

Fishing is, of course, the chief object of the diving birds' excursions under water. Occasionally they go to great depths after their prey, and a Shag was once caught in a crab-pot twenty fathoms below the surface. This species also may be watched at the 'Zoo.' It always begins its dive by jumping up in the water and taking a header, and then strikes hard upwards with both feet. You will see that it does not use its wings at all for swimming, but holds them quite still, lifted just a little away from its body. It strikes out with both feet simultaneously, and in this differs from the Darters (*Plotus*), which adopt an alternate stroke, as you may see for yourself by visiting the Diving-birds' House at feeding-time.

The Darters are the very neatest of all the fresh-water divers, plunging into the water with the quickness of thought and disappearing almost without leaving a ripple. Though in

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their native haunts they are by no means shy, and many are usually found in the same neighbourhood, sportsmen find it very difficult to obtain more than a single specimen at one spot, because on the first shot being fired all the survivors tumble into the water from the overhanging branches on which they perch, and on rising, often more than a hundred yards from the place where they disappeared, show only their heads above the surface; or perhaps it is not more than a sharp, pointed bill that is seen gently cutting the water as a bird makes its way to a patch of floating weeds, where it remains in hiding. Even a bird that is shot is very often not recovered unless it is instantly killed outright. If it be only wounded the chances are that it will never be seen again, for it dives at once, and if pursued clings with its feet to roots or plants under the water until it is dead. When travelling in Brazil, the Prince von Wied tried to shoot Darters from a boat which he allowed to float with the stream to a part of the river where they were swimming about with their slender necks only above the surface, but he usually found that his shot was wasted because the head disappeared before he could fire. When the birds are swimming about in this manner, as they very commonly do, the head and neck have a curiously snake-like appearance, which has earned for them such names as 'Snake-neck' and 'Snake-bird.'

In their natural haunts the Darters resemble Cormorants in their habits; in captivity they are often more amusing. Dr. Bachmann kept one of them as a pet and found it very entertaining in its ways. It was tame from the very beginning, and used to follow him about the house and garden until it became rather a nuisance. On cold days it would go to the kitchen and battle with the cook and the dogs for the most comfortable place on the hearth. Sometimes it happened that no fish could be obtained and the bird did not get its meals regularly; on these occasions it gave the servants no peace owing to its incessant croakings, its noisy protest against their apparent neglect being often emphasised by smart blows.

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A wounded Darter is by no means the only bird which clings to weeds at the bottom of the water in order to evade pursuit. Our familiar acquaintance the Moorhen, when shot at, often dives so quickly that the shot passes harmlessly over the place where a moment before the bird was quietly floating. After diving, it flies through the water at a great pace and conceals itself among the reeds or other vegetation, where it remains for a long time quite still with just enough of its bill out of the water to enable it to breathe, preventing its body from rising by clinging to the stems of water-plants with its long toes. I several times observed this manoeuvre at a pool above the Strathpeffer golf-links, which had a particularly numerous population of Moorhens; but the birds are usually common wherever they can find a suitable piece of water, so that by taking a little trouble anybody may witness for himself at least their sudden disappearance when alarmed while swimming.

Very young chicks often instinctively adopt the same method of escape. The chicks of the Lotus-bird (*Hydralactor gallinaceus*), one of those curious long-toed Jacanas already referred to in the chapter on Courtship, and an inhabitant of Queensland, are adepts in the art. In his book, *Among Cannibals*, Lumholtz says: "The grown bird is not shy, but the young are extremely timid. I had once or twice seen the old birds with young, but as soon as I approached them, the young always disappeared, while the old birds walked about fearlessly, as if there was no danger. It long remained a mystery to me how they could conceal themselves so well and so long, but one day the problem was solved. An old bird came walking with two young ones near shore. I hid behind a tree and let them come close to me. As I suddenly made my appearance, the small ones dived under the water and held themselves fast to the bottom, while I watched them for a quarter of an hour, before taking them up."

Though the Darters and Moorhens seem to find it necessary to cling to some submerged object in order to prevent themselves

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from floating if they wish to remain motionless under water for any length of time, they do not find the same difficulty so long as they are swimming about. Darters, as we have seen, can swim quietly about with only their bill or head and neck above water, and quite a number of species are able to do the same. In the Argentine there is found a bird known as the Blue-billed Duck (*Erismatura ferruginea*) whose ways in the water are very interesting. As these Ducks sail quietly to and fro in the sunshine, they often carry the tail cocked right up in the air at a sharp angle with the body. This gives them an odd appearance, but they look yet more peculiar when, still sailing quietly about on the water, they gradually sink deeper until nothing can be seen but a head and neck at one end, and, sticking up some distance from it, the tail.

This habit introduces us to a puzzling question concerning many water-birds. We know that, like other birds, they have air-sacs distributed all over the body and connected with the lungs and breathing passages, which make the body very light in proportion to its bulk; we also know that their thick plumage wraps them round like an air-cushion and makes them proportionately lighter still; the result of these pneumatic arrangements being that many species float so high in the water that hardly any part of their body is below the surface—perhaps none. It is quite clear, therefore, why they can float with so much ease. But how do they sink? It is not a question of diving; about that there is no difficulty, for the bird can force itself down either by the movements of its wings or by kicking out with its feet.

What is so difficult to understand is how a body that it would be no great exaggeration to speak of as being as light as cork can, without constant vigorous efforts, remain submerged. It is usually explained by saying that the bird expels the air from its air-sacs and thus makes itself heavy enough to sink, and no doubt there is a certain amount of truth in this, because there are muscle-fibres in the walls of the sacs which enable

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them to be compressed and emptied. But this explanation does not seem to be sufficient, because Divers, Grebes, Cormorants, and other related species, even when shot, float so lightly in the water that they scarcely make any noticeable depression in it, and they still float high though their dead bodies be squeezed in order to expel as much air as possible from the air-sacs and lungs, provided the plumage be not so badly damaged and disarranged as to allow the feathers to become water-logged. To indicate how extremely light for their bulk some of these birds are, we may say that the body of a Great Northern Diver, the bulk of which is about a cubic foot, weighs only fifteen pounds, while a cubic foot of sea-water weighs more than four times as much. But in addition to the solid parts there are the down and feathers to be considered, and all the warm—and therefore light—air which is entangled among them; in short, the complete air-jacket in which the bird is clothed. If a pair of bladders or ‘water-wings’ will keep a full-grown human being afloat, how much more buoyant must a bird be that is wrapped in such a jacket?

Others have endeavoured to solve the problem by saying that the bird holds itself just beneath the surface by a continued quiet paddling movement of the feet, or by holding on to something. Certainly the latter is no explanation, because in deep waters there is no convenient “something” for the bird to take hold of; and the paddling movement seems to be out of the question in many cases.

Herr Gätke, a Grand Old Man amongst ornithologists, who spent the whole of his long life in studying birds, relates the following story of a Cormorant which he observed in a pond in the Zoological Gardens at Hamburg. Large numbers of Swallows were flying over the surface of the water, and the greedy Cormorant looked upon them with covetous eyes. But a Cormorant does not hunt for prey in the air, and one would have thought the swift little Swallow would have been quite safe from attack. This Cormorant, however, was a wily bird.

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It immersed itself in the pond to such a depth that only its head was visible above the surface, and in this position it remained *perfectly motionless*. Herr Gätke was quite sure of this, because the least movement of its feet would have been betrayed at once on the glassy surface of the pond. There was nothing apparent to alarm the Swallows, which, foreboding no ill, frequently flew quite close to the murderous beak. Whenever the Cormorant thought it could reach one of them it shot out its head, quick as lightning, and made a snap at it. For some time it was unsuccessful, but at last it did actually manage to catch one of them, and after a few shakes in the water swallowed it. It then quietly sank its body as before, and drew back its neck ready to strike again on the next opportunity.

Here, then, was a water-bird which remained absolutely still in the quiet water of a pond and yet contrived to keep its body below the surface. As far as we can see, the only possible manner in which this could be done would be that the bird should, by some means, make its body just as heavy as an equal bulk of water. There is a kind of Penguin (*Spheniscus magellanicus*) described in the report of the *Challenger* Expedition, which is said to swallow stones for ballast when it is going on a diving excursion, and to vomit them up again at the mouth of its burrow on returning home! If that be true, it is certainly very unusual, and we must try to discover some simpler and more convenient method of adjusting weight than the swallowing of pebbles. Let us suppose, as I think we may, that the bird can compress its air-sacs until they are practically empty; the chief remaining cause of its lightness will then be the warm air which is held in the plumage.

Now, it is known that birds can move their feathers, and very frequently do so. An angry Hen ruffles her plumage and makes herself look several sizes larger; a Blue Titmouse, like scores of other birds, adds to his importance in the same manner when courting; and birds of every species raise their feathers during the bath. The Capped Petrel (*Æstrelata hæsitata*),

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which is the best diver of its order and often remains below for several minutes, shakes the water off its back in a regular shower on coming up.

But birds can also *depress* their feathers—that is to say, they can flatten them against the body, thus considerably diminishing their bulk. This is most often seen when fear predominates over anger, as when a Corncrake or the swift Road-runner (*Geococcyx californianus*) of the United States is running at top speed from its pursuers. It is perhaps most easily observed in Gulls, by lying flat on the ground at the top of a cliff where these birds are numerous and watching them very carefully as they appear over the edge when soaring from below. As they come in sight they are startled to find themselves so near to a human being, and their feathers seem to tighten.

We have said enough to show that birds are able to compress their feathers, and it is perhaps just possible that Divers, Cormorants, Grebes, and others with similar habits of quietly submerging their bodies may be able to tighten their contour-feathers so that nearly all the air is forced out of the plumage, and their bulk by this means, combined with the emptying of the air-sacs, reduced just enough to enable them to sink. It is not easy to imagine a Great Northern Diver being able to do this, because he would have to make himself so *very* much smaller; but it is a great deal harder to imagine any other sort of explanation. Perhaps even the lungs are emptied as much as possible when a bird wants to sink quietly—indeed this is very likely, because all the birds which remain just beneath the surface without moving, or clinging to anything with their feet, keep at least the tip of the beak above water, and being thus able to breathe can manage without any great store of air in the lungs; while all the birds which go entirely under water, head and all, and stay there quite still for any length of time, can only maintain their position by clinging to a root or weeds or the stony bottom of the river, because, being entirely cut off from the air, they are obliged to take in a large supply of it before going under, just as you or I would take a deep breath

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before diving; and so much warm air inside them of course makes them very buoyant.

All diving birds can get their back under water when sailing about, but the Great Northern Diver is a perfect master of the art. This handsome and striking bird is about three feet in length, and its summer coat is principally black, enlivened with white spots arranged in belts, and completed below by a waist-coat of lustrous, satiny white. It is common on all the coasts of the North Sea, coming as far south as Great Britain in the autumn; but it breeds on the Faroe Islands and Iceland, and in Arctic America. When pursued by men in a boat, it first of all swims off at a great pace with the body almost covered; if the chase is kept up it sinks a little deeper, still, however, keeping its head and neck above water; and at last it goes right under and swims horizontally so rapidly that two good oarsmen can scarcely overtake it. Swimming under water gives not only the advantage of concealment and added safety from attack, but also the possibility of greater speed, because when swimming on the surface a lot of energy is wasted in producing waves. All the divers move almost sluggishly on the surface compared with their speed under water. Now and then the Great Northern Diver comes up to breathe, and if it finds that it is being overtaken on the straight course it tries strategy, turning off suddenly at an angle—a dodge which is often successful, for before it is discovered the boat is quite likely to overshoot the mark and give the hard-pressed bird a fresh start.

It uses its large webbed feet only, when swimming; their situation far back on the body is, as we have already said, the best possible position for swimming, but it makes them of very little use for walking—indeed, the bird is said to move along the ground upon its breast and under surface by jerks after the manner of a seal, but pushing from behind with its feet. It does not ever help itself along with its wings like a Penguin, for while the Penguin's wings are mere flippers and well suited to this mode of progression, those of the Great Northern Diver are fairly large and well feathered. Awkwardness on land is not a

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matter of much consequence to a bird which passes nearly the whole of its life on and in the water. Once on the wing, its flight is strong and it can mount to a great height, whence it occasionally plunges downward at almost incredible speed with a noise that may without exaggeration be described as thundering.

Gannets also make tremendous plunges from the air when diving after fish. These birds require a good impetus to carry them below the surface, because their hollow bones and extensive air-sacs render them extremely light. Possibly the air-sacs and the thick plumage of the breast are useful as a buffer and break the force of the blow when the bird strikes the water. Sailors sometimes take a cruel advantage of these tremendous dives of the Gannets. They fasten some bait to a board of soft wood and allow it to float. The Gannet's beak is long and sharp; seeing the bait, he dashes down upon it at tremendous speed, and is caught by his beak piercing the wood and there holding him fast.

The Capped Petrel, already mentioned in this chapter, is now, unhappily, almost extinct. It poises itself in the air for a moment at a height of twenty or twenty-five feet, and then, folding its wings, takes a header into the water. The actual plunge is made with the wings open, and they are used under water much in the same manner as during flight. Petrels can easily be distinguished by the appearance of the nostrils, which are curiously prolonged over the top of the bill in the form of tubes. What the precise advantage of this peculiar arrangement is we do not know, but it may be in some way connected with their aquatic habits, like the membranes which guard the Pelican's nostrils.

In swimming, webbed feet are spread out to their widest extent during the backward stroke and folded with the toes side by side and curved in such a way as to offer as little resistance as possible when being brought forward for the next stroke. Grebes, which have incomplete webs, but make up to some extent for the defect by the flattening of their shank-bones, use their limbs with a sort of feathering movement, the

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leg being brought forward with the narrow edge of the shank towards the front, and the stroke being made with the broad surface flat, like the blade of an oar.

Quite young water-birds, still clothed in down, are often wonderfully active and skilful swimmers, as indeed they need to be if they are to have a reasonable chance of growing up, for they have many enemies. The worst of these in the case of our fresh-water swimmers are pike and rats, which devour many chicks in spite of the mother's frantic efforts to drive them away. No young birds are swift or active enough to evade the deadly dart of a voracious pike, but they are better able to take care of themselves when pursued by man. A family of Coots, for instance, consisting of seven or eight red-headed youngsters and the parents, makes very good progress on the water if followed in a boat. When overtaken, the old birds give the signal to disperse by a series of sharp clucks and look to their own safety. The young immediately scatter on all sides, and when hard pressed dive under the surface and paddle away with all their strength for twenty or thirty yards, when they are obliged to rise for breath. If a chick finds itself still pursued in the open, the same performance is repeated until the little bird is completely exhausted. It has been noticed that the downy covering soon loses its water-resisting power when the young bird is thus pursued, and that instead of appearing dry and nicely puffed out on rising it becomes sodden and spongy. If the fugitive can but contrive to reach the sanctuary afforded by a clump of weeds, however, its chances of escape are greatly increased. It seems suddenly to vanish, without a movement or a ripple to betray what has become of it, and it requires a sharp eye to detect it lurking under a floating leaf, its body completely submerged and its tiny beak projecting above the surface just enough to admit a supply of air. It will remain thus motionless for a considerable length of time until it thinks the danger is past.

In rivers and ponds, birds such as Coots and Dabchicks have a fine instinct for choosing the best spot in which to lie con-

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cealed with the beak above water after a dive for safety. Herr Gätke describes how a Dabchick, which he himself observed, put its beak and eyes above water just where some floating fragments of dry grass and chips of wood made it particularly difficult to detect. This case is an interesting one in connection with what was said some pages back about submersion, because the pond in which the bird was swimming was about three feet deep and was absolutely free from weeds, so there was nothing whatever for the bird to cling to in order to hold itself under water.

Coots, Dabchicks, and Moorhens are three of the best-known birds which frequent our fresh waters, and they have been several times referred to because it is an advantage, when possible, to illustrate habits by reference to familiar species. But there is another species, less common than these, that frequents our streams, which we cannot leave altogether unmentioned, because it is one of the most charming of British birds. This is the Dipper or Water Ousel, a dainty, clean, and spick-and-span little bird, and as romantic in its ways as any I know. The Dipper seems to embody in itself all the romance of the stream, and to enshrine in its beautiful black and white body the half-daring, half-timid, but wholly witching spirit of a water-nymph. Standing one moment on a mossy stone making quaint little courtesys, the next moment it is floating on the water singing a sweetly wild song; it sinks below the surface of an eddying pool and moves along the bottom clutching the stones with its claws and helping its progress by means of its wings, half running, half flying, until it emerges once more, still spick-and-span, into the sunlight, and flies off, like a fairy creature who is at home in all the elements, to disappear through a waterfall curtain, behind which is hidden its cool, green, spray-drenched, moss-walled nest.

CHAPTER XIII

PIRATES AND ROBBERS

The Bald Eagle and the Osprey—An unequal contest—Pirate bands of Fish-Crows—Skuas and their victims—Disgorging the booty—Robbing the sportsman—Molly-mawks—Frigate-birds and Boobies—Methods of compulsion—Pelicans robbed by Gulls—The Woodpecker and the squirrel's storehouse—Appropriating nests and building material—Egg-thieves—How the eggs are carried—Stealing eggs from a sitting hen.

WHAT boy is there who does not revel in a story of daring highway robbery or piratical adventure? Of course we know that such things ought not to be, and we rejoice that in civilised countries piracy and brigandage belong to a past age, however it may be amongst the wilder races of mankind. Yet nobody will deny that these stories of lawless deeds and primitive instincts do stir the imagination and arouse the ever-youthful spirit of romance, and if we find that amongst birds there are robbers and freebooters who are always ready to deprive their weaker kindred by force or threats of what belongs to them, the story of bird-life in its romantic aspects would be sadly incomplete without some account of their doings.

Such incidents are by no means rare in the daily life of many species, but here we must be content with a few of the more striking or picturesque examples.

A freebooter who exercises his lawless calling openly in the sight of the world must have not only courage and daring, but must be able to enforce his will by strength of arms; and what bird is better endowed with these qualities than the Eagle? It is true that we usually regard him as the embodiment of

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bird-nobility—a daring hunter rather than a mere robber, and so he often is. But there are Eagles which often prefer to let other birds do their hunting for them, and which find it more to their taste to rob weaker species of their prey than to seek and kill on their own account.

The most imposing of these piratical birds is the White-headed Sea-Eagle or Bald Eagle (*Haliaeetus leucocephalus*) of North America, which, though somewhat smaller than the Golden Eagle, is a handsome and powerful bird with wings measuring six feet or more from tip to tip. It is a bold hunter as well as a robber, as Audubon's spirited description shows. That naturalist relates how the ruthless tyrant may be seen perched in an erect attitude on the highest summit of the tallest tree, from whence he surveys with stern and glistening eye the scene beneath. He listens attentively to every sound, glancing around now and then lest even the light tread of the fawn should pass unheard. His mate is perched on the opposite bank of the river and, should all be silent, warns him by a cry to remain patient. At this well-known call the male partly opens his broad wings, inclines his body a little downwards, and answers to her voice in tones not unlike the laugh of a maniac; the next moment he resumes his erect attitude, and all is silent again.

Soon the wild trumpet-like scream of a yet distant but approaching Swan is heard, and a shriek from the female Eagle comes across the stream, for she is fully as alert as her mate. The latter suddenly shakes himself, and with a few touches of his beak arranges his plumage. The snow-white bird is now in sight; her long neck is stretched forward, her eye is on the watch, vigilant as that of her enemy. She approaches, however, and the Eagle has marked her for his prey. As the Swan is passing the dreaded pair, the male Eagle starts from his perch with an awful scream, that to the Swan's ear brings more terror than the report of a gun. Now is the moment to witness the Eagle's powers. He glides through the air like a

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falling star, and comes upon the timorous quarry which, in an agony of despair, seeks by various manœuvres to elude the grasp of his cruel talons. It mounts, doubles, and would willingly plunge into the stream, were it not prevented by the Eagle which, long possessed of the knowledge that by such a strategem the Swan might escape him, forces it to remain in the air by attempting to strike it with its talons from beneath. The poor Swan has now become much exhausted, and its strength fails it; it is almost at its last gasp, when its ferocious pursuer strikes with its claws the underside of its wing, and with irresistible power forces the bird to fall in a slanting direction upon the nearest shore. And now the Eagle presses down his powerful feet and drives his talons deep into the side of the dying Swan; he shrieks with delight as he feels the last convulsions of his prey, and the female, who has watched every movement of her mate, sails down to the spot to participate in the banquet.

A bird which can bring down a Swan is an opponent to be dreaded; and there is abundant evidence of its power. Sheep and goats are often numbered amongst its victims, and it has even been known to overcome the cunning and wary fox. Nor is its prowess exercised only against creatures of the air and land. Dolphins and sturgeons are attacked with equal daring, and young dog-fish are seized as they swim beside their mother, for the bird does not hesitate to plunge deep into the water after its prey. But there is a more skilful fisher than he—that inveterate enemy of the finny inhabitants of lake and river, the Osprey—and it is when the two take up their quarters in the neighbourhood of the same fishing-ground that the Eagle enters upon a career of piracy.

Let us imagine the scene. In the early morning, as soon as the mist has cleared away from the surface of the water, the Osprey soars high above the river before beginning its day's work. After sailing at a great height for some time it descends in graceful curves nearer the water, and moves to and



A FAMOUS BUCCANEER

The Bald Eagle of America is a notorious pirate and often robs the Osprey of his prey, swooping down upon him with fiendish shrieks. For awhile the persecuted fisher may escape by swerving aside, but he is always compelled to give in eventually.

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fro gazing into the depths in search of prey. It has not long to wait; soon a fish is seen rising towards the surface, and the observant bird pauses in its flight, hovers motionless for a moment above the spot, and then, with wings closed and ever-increasing speed, darts down upon its victim. There is a splash as from a small cannon-ball falling into the water, and for some moments, perhaps, the bird disappears beneath the surface, to reappear and again take wing with a shiny, wriggling fish firmly grasped in its powerful talons. If the fish is a large one, the bird, weighed down by its burden, moves with slowly beating wings in laborious flight towards its eyrie.

But high in the tree tops beside the shore, keenly watching every movement of the fisher, are a pair of Bald Eagles. They wait until he is well on his homeward journey, and then, with an awful shriek, one of the freebooters dashes down upon him. Well he knows the meaning of that terrible sound, too well he understands its menace. It is a command, as unmistakable as any ever uttered by a knight of the road, to "stand and deliver." But he will not readily yield his precious booty, and as the aggressor rushes towards him like a thunderbolt, he swerves aside and evades the assault. The Eagle spreads his wings and tail to stop his downward course and sweeps in a rising curve with powerful strokes until he is in a favourable position to make another terrible swoop towards the weary Osprey. Again the harassed bird dodges, his complaining cries mingling with the loud shrieks of his persecutor. By this time the Eagle's mate may have joined in the attack, but in any case the contest is an unequal one, and the fisher, handicapped as he is by the weight of his burden, is at length compelled to yield to superior prowess and to relinquish his spoil. A gleaming object drops from his claws, but before it touches the water it is overtaken and seized by the victorious Eagle and carried off in triumph.

This drama is repeated time after time, for, strange to say, the Ospreys never seem to profit by experience, but prefer to endure persecution rather than forsake their chosen fishing-ground

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and the spot where they have made their home, even when there are no family ties to keep them there. Robbed of his dinner, the bird goes back to his fishing and may, if the appetite of his taskmaster is sated, be allowed to return in peace; but sometimes the weary round is repeated until it almost has the appearance of an unwilling but intentional service for the accommodation of the tyrant Eagle.

The unfortunate Osprey is also victimised by bands of robbers who are far too weak to attack him singly, but are able, by joining forces, to make themselves so objectionable that he is glad to throw down his booty in order to escape. Nearly all Birds-of-Prey are held in hatred by the smaller members of the feathered race, and are mobbed by them whenever occasion offers. By force of numbers even Swallows and Wagtails will sometimes triumph over an Osprey, but more redoubtable foes are the pirate bands of Fish-Crows (*Corvus ossifragus*), which sometimes chase him with open bill and extended claws. These Crows, which are a North American species, have a taste for maritime life beyond that of other kinds, though our own Carrion-Crows often haunt the sea-shore and make a meal of any animal which may be cast up by the waves. Tired birds which are drowned as they approach the end of their long migratory flight—and immense numbers perish in this manner—furnish a welcome feast to the watchful Carrion-Crow.

The Fish-Crows, like the Bald Eagle, are in their way skilful hunters. They can easily catch the quaint and agile little Fiddler-Crabs,¹ or dig them out of their burrows in the mud-flats, where they hide themselves at sight of their pursuers. They can also catch fish with considerable dexterity; but they are always ready to seize an opportunity of turning robber. Sometimes they are no better than 'sneak-thieves'; they help themselves to the eggs, and even the young, of other birds, and if the owner is formidable enough to make such a proceeding

¹ Described in another volume of this series—*The Romance of Animal Arts and Crafts*, p. 65.

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dangerous, as in the case of the Cormorant, they wait until the nest is left unprotected, and then quietly make away with the contents. The species which are most annoyed by these dusky robbers, however, are Terns and some of the smaller Gulls, which are pursued and attacked persistently until they are sometimes compelled to disgorge the small fish caught by them within sight of the Crows. But most Gulls fly far too well to be caught by a Crow, and so it often happens that the attacking party is frustrated in its attempts, and is obliged to return without plunder, to seek its food by more legitimate means in the eddies.

The greatest experts in this peculiarly objectionable form of robbery are the piratical Skuas (*Lestris*), whose threatening manoeuvres in defence of their nest are described in another chapter. In shape and plumage the Skuas, or 'Jaegers' as they are sometimes called, resemble Gulls, but they are so peculiar in several respects that we must regard them as forming a family by themselves. Short of neck and stoutly built, they have a strongly hooked bill and—what is a very unusual feature—stout, pointed, sharp-edged claws upon their webbed feet. Their plumage is for the most part of a dusky brown, and on the under side of the body is almost fur-like. They seem to combine the characters of a Gull with those of a Bird-of-Prey, for they resemble the latter not only in the possession of hooked bills and claws, but in their powerful flight and bold disposition. They inhabit the colder regions of the earth, but both the Common and Richardson's Skua are found as far south as the extreme north of Scotland, and other species occasionally come to these islands as winter visitors.

The Skuas might well be spoken of as good all-round athletes. They are excellent runners, swim beautifully, and in their flight may almost be compared to a Hawk or an Eagle. They rise into the air with ease, either from the sea or from level ground, and the variety of their movements on the wing is exceedingly interesting to watch. Sometimes they skim over the waves

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without the slightest apparent movement of the wings; then, after slowly mounting, they sail to and fro with a few occasional rapid strokes to drive themselves onward. Suddenly they check their speed and seem to steady themselves to a halt with a rapid flutter before plunging obliquely downwards, as though tobogganning on an invisible slide, towards the sea; then a great upward curve, a pause, and a mad series of twists and dashes and intricate windings—a delirium of flight. Their only weakness is in diving, wherein they appear to be sadly handicapped by their buoyant plumage. As fishers, therefore, they are not particularly successful, so they take advantage of their efficiency in other ways to profit by the industry of their neighbours. They are the winged pirates of the northern seas, dreaded by every bird that earns a livelihood by fishing. Gulls, Puffins, Guillemots, and Terns alike are victimised by them, and no tyrant is more universally dreaded. Their appetite is as great as their activity, and the daring and ferocity with which they compel even such birds as are far larger than themselves to minister to the cravings of their ravenous greed are without parallel amongst birds.

Their methods are similar to those already described in the case of the Fish-Crow, but that bird is a mere bungler compared with the Skuas. Always ready to attack, they watch the Gulls at their fishing, and as soon as they see that a capture has been made, they dash towards the successful fisher with the full determination of compelling him to yield up his prey. They are not in the least deterred by the fact that the fish has already been swallowed. Hotly pursued, it is impossible for the Gull to escape; the pirate sails down upon him as easily as a Falcon upon a Duck. Time after time he rushes in with savage screams: the Gull turns and dodges and strives vainly to evade the impetuous attack of his tormentor, who at last, by two or three sudden dashes, forces him to disgorge his meal. He may now go in peace and renew his fishing, while the Skua enjoys his dinner at leisure or turns his attention to fresh

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victims. Some of the more vigorous Gulls show fight, but most birds turn tail and flee at his approach, or, if possible, dive out of sight. But he is far too cunning and impetuous to be often beaten in the contest.

His marauding habits are not confined to mere bullying and robbery, for it not unfrequently happens that he will attack any sea-bird that is so unfortunate as to be caught while engaged in hunting for worms or molluscs on the shore, and, not satisfied with making it yield its food, will kill and devour the bird itself, striking it dead with a single shattering blow of his beak. Wounded birds are torn to pieces without pity, and nests are plundered in the most audacious fashion. Nordmann, writing of the Common Skua, says that as he wings his way towards a rock whereon thousands of birds have made their nests, he is greeted by a general shriek of abhorrence, yet not one of the brooding birds ventures to offer serious resistance to the invader. He snatches the young birds from the very beaks of their parents, who follow in angry protest a little way, but soon give up the hopeless pursuit. He carries his prey to the sea and devours it; then remembering his own hungry nestlings, he flies home to them and disgorges his meal to satisfy their demands for food.

When making his raids he appears to use no weapon besides his beak, but it seems likely that his formidable claws may also be resorted to in a vigorous attack. After an abundant meal the Skua sits quietly on a rock for some time, with his feathers puffed out, apparently enjoying a luxurious nap until—and it is not very long to wait—the calls of hunger again stimulate him to fresh misdeeds.

The Skuas seem to be entirely devoid of fear, and will even attack an Eagle if it comes too near the nest. Their bold and gluttonous nature renders them easy to capture, for they will greedily swallow almost any bait that is offered to them, and they have little more respect for man than for the birds which they rob. Mr. Seebohm, in his book on *The Birds of Siberia*,

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states that on one occasion when he had just discharged both barrels of his gun, bringing down two Dunlins and a Little Stint, a couple of Buffon's Skuas suddenly flew down upon the latter bird where it lay a few feet off, quarrelled over it, and carried it off before he could wade through the mud to the rescue.

Some birds make a regular practice of following sportsmen on the chance of flying off with game that falls to the gun. The Bald Eagle varies his piracy in this manner, and in winter shooting it is no very rare occurrence for one of these birds to keep a watch over the gunner's movements and swoop down and carry away any bird that drops at a sufficient distance from the stand, before it can be retrieved; sometimes, however, the Eagle becomes the victim of his own manœuvres, for he mistakes a wooden decoy for an unsuspecting bird, and in stooping to it is shot dead by the gunner who lies hidden within a circle of heaped-up seaweed.

In some places Skuas get on terms of great familiarity with fishermen and accompany their boats to the fishing-ground for the sake of the refuse and garbage which is thrown to them. The fishermen consider their presence a lucky omen—a favourable opinion which is not shared by any other living creature.

If there is "honour among thieves," the Skuas are an exception to the rule. During the *Discovery* Expedition to the Antarctic, Dr. Wilson saw a McCormick's Skua (*Megalestris maccormicki*) swoop down on a neighbour's nest and fly off with an egg in its beak when the owner was only a few yards away. The bird whose nest had been robbed started after the thief in fierce pursuit and forced him to give up his booty, but the stolen egg was of course smashed on the rocks.

These birds begin to give a taste of their quality almost as soon as they leave the egg. Tiny chicks not more than a day or so old have been seen to drop a tempting morsel of fish, brought to them by their parent, for the possession of which they had been wrestling with all their might, and to engage in

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a fierce stand-up fight for it. Though no larger than barn-door chicks of the same age, they were already armed with formidable claws and bill, and they went for one another like little furies until they were both exhausted.

Although two chicks are almost invariably hatched (unless a neighbour has previously stolen one of the two eggs), it is seldom that more than one of the youngsters survives, the other almost invariably becoming a meal for the first McCormick's Skua that can snatch it from the nest. The favourite food of these robbers with the Scotch name, however, consists of the eggs and chicks of Adélie Penguins. The Skuas nest in company with the little Penguins, and it is not one of the least eccentric characteristics of those quaint birds that they seem never to molest their enemies even when they make their quarters in the very midst of the penguinery. The swarthy robbers stand around the groups of dapper Penguins apparently on the best of terms with them; but appearances are indeed deceptive, for the moment a baby Penguin wanders a few feet away from its companions, one of these dreadful brown-coated brigands pounces upon it, and in an instant the unfortunate little creature is dead and being torn to pieces within a few feet of its nest. Now and then, when one of their undesirable neighbours approaches with evidently felonious intentions, all the Penguins round about do their best to shout him off, but they rarely succeed in this. When young Penguins are not in season these Skuas subsist on a diet of fish which is supplied to them, under compulsion of the usual kind, by Petrels. Occasionally they do a little fishing on their own account.

According to Captain Hutton, another bird which has a taste for piracy on the high seas is the Black-browed Albatross (*Diomedea melanophrys*), a bird which is common round Cape Agulhas and is known to sailors as a 'Molly-mawk.' This bird sometimes does its own fishing, but it generally prefers, when anything good to eat is under water, to let a Petrel

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—or some other bird of similar habits—fish it up; then, giving chase, croaking and running along the top of the water with outstretched wings, it compels the Petrel to drop its captive, which it seizes before it has time to sink.

Similar tactics are followed by those marvellous fliers—the most marvellous of all, some people consider—the Frigate-birds (*Fregeta aquila*). These birds were so named by our sailors on account of their swiftness on the wing, and their habit of cruising about near other species and daringly pursuing them with hostile intent. Their usual victims are Tern, small Gulls, and especially Boobies (*Sula piscator*). The last-named species, a kind of Gannet, is one of several birds which have been endowed with this uncomplimentary title by seamen on account of their stupidity in alighting on ships and allowing themselves to be easily taken by the hand. In some old narratives of voyages, Boobies are uncompromisingly called ‘Fools’; no doubt the milder term was picked up from Spanish or Portuguese sailors of those days, for in their language ‘fool’ would be ‘bobo,’ a word easily converted into ‘booby’ in the fo’c’sle of an adventurer.

The doings of these birds are so quaintly narrated by Leguat that we cannot do better than quote his account of their relations with the Frigate-birds, which runs as follows:—

“The Fools come ev’ry Night, and Roost in the Island; and the *Frigats* which are larger, and so call’d, because they are light, and admirable Sailers, lie in wait for them on the top of the Trees, from whence they flounce down upon them like Falcons on their Prey, not to kill them, but make them bring up the Fish that is in their Craw, which the Fool as soon as it is thus struck, is forc’d to do. The Frigat catches it always before it comes to the Ground: The Fool cries, and sometimes is very unwilling to part with its Prog, but the Frigat who is a bolder and stronger Bird, laughs at its Cries, mounts into the Air, and down he flounces again upon it, seizes upon the Throat, and do’s so till he has compell’d it to obey.”

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According to Mr. H. O. Forbes, the Gannets in the Keeling Islands are encouraged to obey by a somewhat less violent but equally effective method, refractory individuals being seized by the tail by the Frigate-birds and treated to a shake that rarely fails of successful results.

Like Skuas, Frigate-birds steal from one another whenever they get an opportunity. Mr. Palmer, who collected birds for the Hon. Walter Rothschild in Laysan and the neighbouring isles, writes in his diary: "While walking in Laysan I turned some of the Frigate-birds which had young off their nests. Scarcely had I pushed one off when another Frigate-bird would rush up, seize the young one, fly off, and eat it. Sometimes the parent bird would give chase, but it always ended in one or the other eating the young bird. I could scarcely believe my own eyes, so I tried several; but they would even take young birds out of the nest which were almost fully feathered."

The bold and interfering behaviour of various kinds of Gull when anything of the nature of food—or even anything which looks in the least as if an enterprising Gull could manage to swallow it—is in question, is well known. Audubon gives a very amusing instance of their impudent meddling with the business of other birds, the species concerned being the Black-headed Gull (the Gull with which, as a winter visitor, Londoners have in recent years become familiar), and the Brown Pelican. The Pelicans used to be found in great numbers at various places along the coast of the Southern States, where they carried on their fishing in the shallower waters and lagoons. The same localities were the haunt of immense numbers of the Gulls. When a Pelican plunged headlong into the water, with his great pouched bill spread open like a net, several of the watchful Gulls would sail up gracefully on widespread wings, and when the brown bird emerged to drain off the water from his pouch before swallowing the numerous little fishes contained in it, one of them would nimbly alight

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on his very head to demand a share of the catch. The Pelican, displeased and disconcerted by such excessive familiarity, bungles a little over straining his fish, and probably opens his bill to resent the rudeness of his unbidden guest. That gives the Gull his opportunity, and with a gentle stoop he adroitly helps himself to one of the glittering fry in the pouch and makes off with it. "At times," says Audubon, "several Gulls would attempt to alight on the head of the same Pelican, but finding this impossible they would at once sustain themselves around it, and snatch every morsel that escaped from the pouch of the great bird. So very dexterous were some of the Gulls at this sport, that I have seen them actually catch a little fish as it leaped from the yet partially opened bill of the Pelican." He also states that they follow and tease porpoises in the same manner.

Other naturalists have not succeeded in observing the Gulls behaving in this way, so piracy may not be a regular habit with them; but however that may be, persecutors do occasionally lie in wait for the Pelican to rob him on his homeward journey—birds more to be dreaded than the impudent, but not aggressive, Gull. These are the Caracaras (*Polyborus*), whose falconine structure and predatory habits enable them to make themselves very unpleasant towards the Pelican. As he flies to the nest with laden crop, the Caracara suddenly attacks him from above, darting down with shrill screams and striking with his talons until the poor bird is compelled to pay the price of peace. The fisher is never attacked as he goes to the water; his tormentors have enough intelligence to await his return, and they do not pounce until he is over land, lest the fish which is disgorged should fall into the water before it can be seized. One of the South American Caracaras is said to pursue Cranes in the same manner.

Another Bird-of-Prey, the Indian Tawny Eagle (*Aquila vindhiana*), is not more particular about its food, or the way in which it obtains it, than the Bald Eagle of America, for it



BIRD PIRATES

Black-headed gulls teasing a brown pelican, and alighting on its head to rob it of the fish with which it has filled its pouch.

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subsists to a great extent by robbing its smaller allies, such as Kites and Falcons. It is the commonest species of Eagle in most parts of India, and is a great nuisance to falconers on account of its troublesome habit of pursuing tame Falcons, mistaking for prey the jesses which are attached to their legs.

Bird robbers and thieves are far too numerous for all to be mentioned, but we will give a few of the most notable examples. They usually direct their unwelcome attention to the nests or eggs of other birds, but that is not invariably the case, for it may happen that a squirrel or some other small animal is the victim. In the cypress-swamps and thickly wooded districts of the United States, where it makes its home, that fine bird the Ivory-billed Woodpecker (*Campephilus principalis*) has often been seen to break up a squirrel's winter storehouse in order to help itself to the nuts and acorns. A few strokes are sufficient to scatter the store in all directions, for these birds can use their terrible, spike-like bill with tremendous effect, as the following remarks of Wilson about one of them will show : "On being caught it uttered a loudly reiterated and most piteous note, exactly resembling the violent crying of a young child, which terrified my horse so much as nearly to have cost me my life. . . . I carried it with me under cover to Wilmington. In passing through the street its cry surprised every one within hearing, particularly the females, who hurried to the doors and windows with looks of alarm. I drove on, and on arriving at the piazza of the hotel where I intended to put up, the landlord came forward and a number of other persons, all equally alarmed at what they heard. This alarm was greatly increased by my asking whether they could find accommodation for myself and my baby ; the man looked blank and foolish, while the others stared with still greater astonishment. After diverting myself for a minute or two at their expense, I drew my Woodpecker from under the cover, and a general laugh took place.

"I took him upstairs and locked him in my room while I went to look after my horse. In less than an hour I returned, and on

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opening the door he set up the same distressing shout, which now appeared to proceed from grief that he had been discovered in his efforts to escape. He had mounted along the side of the window, nearly as high as the ceiling, a little below which he had begun to break through. The bed was covered with large pieces of plaster . . . a hole opened large enough to admit the fist close to the weather boards; so that in less than another hour he would certainly have made his way through. I now tied a string to his leg, fastened him to the table, and again left him. As I reascended the stairs I heard him again hard at work, and on entering had the mortification to find that he had almost ruined the mahogany table. While engaged in taking a drawing of him, he cut me severely in several places, and, on the whole, displayed such an unconquerable spirit that I was frequently tempted to restore him to his native woods."

It is clear that a squirrel would have no chance of defending its property against such a robber. As a matter of fact, a far less powerful bird, our own Nuthatch, is said sometimes to drive out squirrels from their nest and to take possession of it.

The irrepressible Sparrow often drives Swallows from their home and utilises it as a nursery for its own family. There are stories of Swallows having taken vengeance for the injury by assiduously building a mud wall over the entrance to the nest and thus imprisoning the robber; we will not go so far as to say that this is impossible, but it is very difficult to believe that the intruder would not easily drive away the owners of the nest with his sharp bill if they attempted to punish him in this way, or that he would have the least difficulty in breaking down the prison wall of mud while it was still soft. It is usually possible to distinguish at once a nest that has been thus appropriated, for Sparrows are untidy birds, and you are pretty sure to see bits of straw or other rubbish sticking out of the opening when they are in possession. They have been known to bury the original nest altogether, in a mess of litter.

The appropriation of an entire nest is, however, a rare

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offence compared with the theft of building material. It must be confessed that nearly all birds of social habits at the time of nesting are ready to spare themselves the trouble of hunting for material and carrying it home if they can steal what belongs to a neighbour. I have often watched Rooks attempting to filch sticks from another nest in the rookery, but they have usually failed, for even when they have not been detected by the owners—and it is seldom that one or other of them is not keeping an eye on the nest—and promptly driven off or made to drop the stolen property, other birds of the colony have interfered; whether from jealousy, or, as is more likely, from a self-protective respect for personal property when another bird is the offender, it is difficult to say. If a stick is actually removed, it is lost altogether, even when the thief is not allowed to keep possession of it, for it is a curious fact that these remarkably intelligent birds never pick up twigs that have fallen from the nest, but go to hunt for fresh material elsewhere. At first sight this appears foolish, for why should the birds laboriously carry sticks, often from a considerable distance, when there is an abundant supply lying under the very tree in which the nest is situated? The explanation is really quite simple. It would be an impossible feat for a Rook to fly straight up to its nest from the ground beneath, burdened with the weight of a stick. He must rise obliquely, and to do that he would be obliged to bear the stick *away from* his tree first, before flying to the nest with it. So you see the Rook's behaviour in these circumstances is quite in keeping with his reputation for wisdom.

There can be no doubt, indeed, that the birds in which intelligence has reached its highest development are those of the Crow family, and when they are intent on plunder they often give evidence of a great deal of ingenuity. Nearly all of them have a fondness for eggs as an article of diet; consequently egg-stealing has become with many species quite an art. An egg is an awkward thing to hold, and if it is too

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large to be grasped in the bill, how is the bird to carry it away? Rooks, Crows, Jackdaws, and Magpies have solved this problem in a manner worthy of Columbus himself. Their method is to run their bill neatly through the shell, and carry it spitted thus as upon a skewer. The American Magpie (*Pica pica hudsonica*) invariably deals with Hens' eggs in this way, and Jackdaws on the Bass Rock carry off sea-birds' eggs in the same manner. Mr. Dixon says these Jackdaws make regular plundering expeditions; and as about twelve thousand Gannets nest on the rock there is plenty of scope for their depredations.

One of the most notorious birds of Canada and the older States is the common Blue Jay. It is as conspicuous on account of its bad habits as for its brilliant blue plumage and fine manner and bearing. In nesting-time it is common to hear the lamentations of birds whose young it has carried away, and the number of eggs it devours is enormous. It is a bully of the worst type; sneaking and cowardly when it meets with any resistance, cruel when it finds a bird wounded or in any way at a disadvantage, and merciless to the smaller kinds. "There is little doubt," writes Mr. Manly Hardy, "that they destroy many nests of eggs and young; all of the *small birds say so*. Let a . . . Pigeon come among them and you hear no outcry, and a Flicker or any other Woodpecker creates no disturbance; but let a Blue Jay, Grackle, or Crow put in an appearance, and every bird in range begins to call him a thief, and I never knew them to slander their neighbours. Just think it over and see how this agrees with your experience." As a rule this is, no doubt, true; small birds mob and abuse any individual of species which they have good reason to regard with hatred; but they do occasionally make a mistake or "slander their neighbours," or they would not surround and revile a quite harmless (to them, at all events) and merely bewildered Owl that has been so unfortunate as to have left the seclusion of its roosting-place while the daylight birds are going about their business.

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The Californian Jay (*Aphelocoma californica*) is no better than its blue cousin; in fact, it is regarded as one of the greatest nuisances among birds, for it will eat eggs at the farms as fast as the Hens lay them, three or four Jays hurrying to the feast at the first cackle.

Some birds, however, go to even greater lengths than this in order to satisfy their passion for eggs. The curious Sheath-bill or Paddy (*Chionis alba*), a bird that looks something like a white Pigeon with a big, ugly beak, and is really allied to both Oystercatchers and Gulls, is peculiarly shameless in its thieving. Its home is about the shores of Antarctic seas, where it haunts Penguin rookeries and colonies of Shags, and Dr. Harvey Pirie of the *Scotia* saw one actually boring under the wing of a Shag as it sat on its nest, in order to suck the eggs! The Paddy's own nest might serve as an index of its character, for it is built largely of egg-shells and Penguins' bones.

It might be thought that here we had reached "the limit," as they say in America; but Professor Ritzema Bos, in his interesting book on *Animal Foes and Friends*, says: "I myself have often noticed a Rook or a Hooded Crow sheltered on the branch of a tree near the nest of a tame Duck, till this had finished laying an egg. As soon as this was done, and the Duck had left her nest, the Crow flew down to feast on the warm egg."

It would be possible to go on giving interesting examples of this aspect of bird nature almost indefinitely; but there is an element of comedy in this picture of the Crow patiently waiting for the simple-minded Duck to provide him with a hot lunch which tempts us to leave the subject there.

CHAPTER XIV

FLIGHT

The machinery of flight—The light construction of a bird—The lightest bird many times heavier than air—Power of flight dependent on rapidity of wing-movement—Style of flight dependent on shape of wing—Steering—Formation and order of flocks—Closing up the ranks—Speed of birds in full flight—Gliding, soaring, and hovering—The problem of the soaring bird—The height to which birds soar—Birds and ships in mid-ocean.

EVEN Solomon had to confess that “the way of an eagle in the air” was one of the things which he found too wonderful for him; and although many wise and learned people since Solomon’s day have devoted a great deal of study to the flight of birds, it cannot be said that they have arrived at a full understanding of it.

Before we turn our attention to flight itself we ought to know something concerning the machinery by which it is performed. In the first place, as we have already mentioned in speaking of swimming birds, it is important, if rapidity of movement is to be attained, that the moving body shall be of such a shape as to be affected as little as possible by the resistance of the air or other medium through which it moves. In other words, it must have good ‘lines,’ just as a racing yacht or other vessel that is built for speed must have good lines. How does a bird’s body meet this requirement?

If you examine the skeleton of a bird you will see that the trunk bears a rough resemblance to the hull of a ship with a very deep keel, not unlike the keel of a yacht. That already promises well for swift progression; but the shape of the living bird is even better, for the curves are continued forwards into

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the neck and taper off behind to the tail, thus presenting an outline beautifully adapted for easy locomotion. Movement through the air is further facilitated by the arrangement of the close-fitting, overlapping feathers, all pointing backwards towards the tail.

The wings are set high upon the trunk, the heaviest part of which is formed by the great mass of muscles on either side of the breastbone, attached to the deep plate of bone which forms the keel. These muscles are the chief instruments for working the machinery of the wings, and their position at the lowest part of the body gives them all the value of ballast and adds very greatly to the stability of the whole machine during flight.

Each wing consists of three parts arranged in the form of the letter Z, the top of which corresponds to the upper arm, the downward stroke to the forearm, and the lower horizontal stroke to the hand. In birds only three of the original five fingers are left, and one of these, the thumb, is extremely small. The other two are bound together and form a rigid rod. Each division of the arm bears a series of long, broad quill or flight feathers, those on the hand being known as *primaries*, those on the forearm as *secondaries*, while those which are nearest to the body—that is to say on the upper arm—are called *tertiaries*. The use of the *tertiaries* is to close the gap which would otherwise be left between the body and the main part of the wing (bearing the *primaries* and *secondaries*) during flight, and which would seriously interfere with the efficiency of the machine, especially in long-armed birds such as the Albatros.

We will not enter into details concerning the other sets of feathers with which the wing is provided, but will refer merely to the chief quills or flight feathers, which are borne on the forearm and hand. These feathers are attached in such a way that when the wing is extended they are spread out in neat order by a band of elastic tissue which stretches from the hand to the armpit, and through which they pass. Owing to the manner in which the feathers overlap, and to an ingenious arrangement

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of little tendons, the secondary feathers are pressed close together during the downward stroke of the wing and present an even, unbroken surface to the air, while during the upstroke they twist round so that the webs separate and let the air through. But for this arrangement the bird would lose during the upstroke much of the advantage which it gains by the downstroke of the wing, by which the body is propelled.

Each quill feather consists of a central shaft with a great number of little branches which spring from it on each side and are elaborately hooked together to form the vane of the feather. The whole wing is constructed for lightness and strength, and is made up, as Mr. Headley neatly expresses it, of very little besides "masts, sails, and cordage."

Many of the bones of a bird contain air-spaces which are connected with extensive air-sacs in the body, and these with the lungs; but in spite of its light build a bird is still very heavy when compared with air, and is obliged to raise itself chiefly by muscular effort, though aided to some extent by a kite or parachute-like action. The warm air in their bodies never enables birds to float about like balloons, as some writers appear to believe.

Ordinary flight undoubtedly requires a great deal of energy, and that is why birds have a rapid circulation and breathe quickly; which again is why they have big appetites.

Flight is always begun by a standing or running jump, and whenever possible *against* the wind, the force of which, acting on the sloping surface of the wing, helps to raise the bird. The jump is followed or accompanied by a rapid flapping of the wings, especially when the bird starts its flight from the ground. When once it is under way only a small proportion of the push of the wing is required to sustain the body, the rest of the force, owing to the direction of the wing-stroke, being used to thrust it forward.

Some birds, such as the smallest Humming-birds, measure not more than three inches from the tip of one wing to that of

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the other ; while others, like the Albatross, have wings which spread for twelve or fourteen feet. A bird's power of flight does not depend so much upon the length or shape of its wings as upon the rapidity with which they can be moved. In the little Humming-bird this is so great that when it is hovering in front of a flower its body, head, and tail appear to hang in a halo of mist, which is all there is to show that the bird possesses wings at all. The Humming-bird's flight, indeed, is not unlike that of an insect, and the resemblance is increased by the rapid darts, ending in a sudden poise, in which the bird so often indulges.

A bird's *style* of flight, on the other hand, depends very greatly upon the shape of the wing ; indeed, it is almost possible for an ornithologist to tell you, when shown a wing, what is the character of its owner's flight. You will realise that this may be so if you will compare the short, whirring flight of a Partridge, with its short, rounded wings, and the easy, skimming, long-sustained movements of a Swallow, whose wings are long and pointed.

The way in which birds steer their bodies through the air is not well understood, but there is no doubt that wings, tail, head, and feet all play their part. Some species show the most marvellous skill in turning and steering, and as an example of these we may take the Yellow-billed Cuckoo (*Coccyzus americanus*), or 'Rain Crow,' of North America, which frequents woods and dense thickets. This bird threads its way amidst the closest foliage, and pursues a tortuous course through a maze of boughs with the utmost freedom. Flying now sideways, now forwards, turning, twisting, or doubling at right angles, it flits hither and thither with as much apparent ease as if passing through clear, unobstructed space. In this case the complicated movements are evidently greatly assisted by the long tail, which may be seen swinging about like a rudder ; and the same applies to many other birds. Some of the web-footed birds with short tails, such as the Murres (*Uria lomvia arra*) of the Northern Seas, steer by means of their feet, which they

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spread out or contract as occasion requires. The Murres swarm like flies, in uncounted millions, about rocky islands in the Behring Sea.

There appears to be no sort of organisation about a flock of Murres or Gulls, but many of the birds which associate in flocks and undertake long flights arrange themselves in orderly ranks which are often very characteristic of the species, and it is frequently possible to make a good guess as to what kind of birds they are even when they are so far away that the individual members of the flock cannot be clearly distinguished. A very favourite formation is that of a wedge or $>$ (see illustration, p. 258), the two branches of which are generally of unequal length. This order is assumed by the common Wild Duck, as well as by Grey Lag Geese and Swans, and it is beautiful to see the way in which the birds break up and re-form their ranks when they change the direction of their flight. The leader of the party—that is to say, the bird at the point of the wedge, where it cleaves the air—has by far the most fatiguing position, and when he becomes weary he falls in the rear and a neighbour takes his place. From time to time as the flock passes onwards the leader utters a loud cry or scream, as if to inquire whether all is well behind, and is answered by what is no doubt an “all’s well” cry from some of the birds occupying the rear ranks.

Grey Lag Geese appear to fly in families, presumably with the old gander at the apex as leader. Sometimes two or three families join together into a string, but instead of all uniting into one large $>$, each family forms its own little party, and altogether they make up a series of V’s or W’s, of which first one and then another takes the lead. In the nesting season, when they fly in pairs, the gander almost invariably follows behind the goose, no doubt recognising the enhanced importance of his mate at that time of the year.

Cranes also form a $>$ or \geq shaped line and, like Swans and Geese, fly very high and at great speed. All these birds keep

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their ranks with the skill of a regiment of soldiers and as if actuated by one mind, every movement being conducted with wonderful regularity. Some birds, such as Flamingoes, which arrange themselves in long uniform files, bird behind bird, even keep time in the beating of their wings.

The Black Brant, which moves with short, rapid, energetic strokes at a greater speed perhaps than any other kind of Goose, adopts a line formation, the birds forming a single rank side by side at right angles to their course, so that it is possible to see the entire strength of a flock at a single glance along its front. The birds 'dress up,' as a drill-sergeant might say, so close together that the tips of their wings almost touch. The whole company, which sometimes forms a line several hundred yards in length, seems to be governed by a single will and constantly moves in unison. At one moment it will glide along but sixty feet or so from the ground, then suddenly, and for no apparent reason, it will rise to three times that height, or sway rapidly to one side or the other. Now and then a wave seems to pass from end to end of the line owing to one bird advancing or rising a little and its companions promptly 'dressing up' to it. The effect of these rapid undulating movements, which are carried out with great regularity, is exceedingly beautiful to watch, and has been compared to the swift waving motions which pass along a pennant in a light breeze.

Other birds—as, for example, Shags—fly in long curving lines, and others again in huge flocks which melt into curious and ever-changing shapes as they pass along. This is particularly noticeable in the case of flocks of Starlings flying to roost.

Concerning the speed of a bird in full flight we shall have something to say when considering migration. Our real knowledge of the subject is small, the only thoroughly reliable records being those in connection with the flight of Homing Pigeons. In 1892 one of these birds accomplished a flight of a hundred and fourteen miles at the rate of eighty miles an hour; but the usual speed in matches over long distances seems

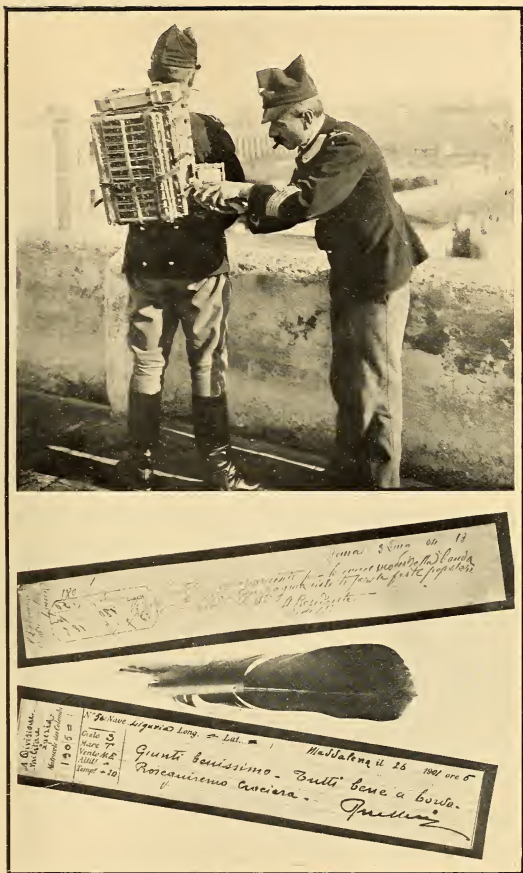
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to be somewhere between thirty-five and seventy miles in the hour.

The practice of using Pigeons as letter-carriers is a very ancient one—at least three thousand years old; and in the days before the invention of telegraphy there was no other way in which news could be conveyed for long distances with anything approaching the same rapidity. Five centuries ago the Turks had organised a regular system of Express Pigeons between high towers thirty or forty miles apart, where sentinels stood constantly on the watch for the home-coming birds, ready to receive the message and pass it on to the next post by means of another Pigeon. The hour of arrival and dispatch was written down at every tower, and for greater security a duplicate message was always sent two hours after the first. The slip of paper on which the message was written was often enclosed in a tiny gold box, and was slung from the bird's neck.

Pigeons are still used as messengers, especially for military purposes, and in the Italian army the Pigeon service is particularly well organised. The modern way of sending the dispatch is to insert the thin paper, closely rolled, in a quill, which is stitched to one of the tail-feathers—a plan which is much safer than the old method, and less irksome to the bird.

The letter-quill attached to a tail-feather reminds us of a curious Eastern custom with regard to Pigeons. The Chinese make little whistles, something like miniature organ-pipes, from gourds, and fasten them to the tail-feathers of their Pigeons. The whistles are attuned to different notes, and a flock of Pigeons all provided with these musical instruments are said to produce a very pretty effect, like the sound of Æolian harps, as they wheel through the air. The experiment was tried in England by Lady Dorothy Nevill, who writes in her *Reminiscences* that “people used to be considerably astonished at such heavenly music, and their bewilderment and puzzled faces afforded me great amusement. No one but myself, I believe, has ever organised such a winged orchestra, but should



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HOMING PIGEONS USED BY SOLDIERS

Pigeons form a regular part of the Italian army, each bird being registered, like a soldier. They are used for bearing despatches, the message being written on a narrow slip of thin paper (see lower part of the above illustration), which is then rolled up tightly and placed in a quill attached to one of the tail feathers. On active service the birds are carried by cavalymen in wicker knapsacks until required.

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any one care to make the experiment, I can assure them they will be well rewarded for their trouble."

Besides what we may call ordinary flight—that is to say, flight which is carried on with regular beats of the wings—there are other methods known as 'gliding,' 'soaring,' and 'hovering.'

Gliding may often be compared to free-wheeling on a bicycle, and is frequently practised by birds of many different kinds. After getting up speed by means of a few rapid strokes the wings are held more or less extended but motionless, and the bird is carried onwards through the air for a considerable distance without further effort. Gliding is also seen when a Pigeon comes down from the top of a building to the ground; in this case the impetus is provided by the force of gravity, and the bird glides down with wings raised and extended, as though sliding on an invisible toboggan slide, until it comes quite near to the ground, when it puts on the brake by throwing itself backward a little with outspread tail and giving a few short beats with its wings. This method of flight, but in a reversed sense, is also seen when a Falcon rises after missing a 'stoop' at its quarry, the impetus gained in its hurtling swoop being sufficient to carry the bird upward again, with a slight adjustment of its wings and body, for a considerable part of the distance covered in its descent.

Soaring, on the other hand, is seen when a bird mounts to a great height and sails round and round in the sky with its wings all the while apparently quite motionless. Crows, Pelicans, Storks, Eagles, and many other birds are adepts in flight of this kind, which is perhaps what Solomon had in mind when expressing his perplexity concerning the manner of flight of the Eagle. It is, indeed, the most difficult of all to understand, and the only explanation of which we can conceive is that it depends upon wind or air currents which bear the bird upward like a kite in a breeze. But here we are met with the difficulty that many birds can, and do, soar on an

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apparently windless day, when hardly a breath of air is to be felt on the land, and the clouds hang motionless in the sky. So remarkable is this that Gätke, who spent his whole life watching birds in Heligoland, was convinced that wind is by no means necessary to a soaring bird. Speaking of the soaring of Honey-Buzzards, he says that the birds do not make use of the slightest movement of their wings, or of air currents, to reach the requisite elevation, but can soar upwards in a calm atmosphere with the wings outspread and perfectly motionless. He tells us that he saw them doing this not once, but hundreds of times every year, and was always puzzled to know how, in an atmosphere so much lighter than its own body, a bird could rise like a balloon.

It is true that there are, as we have already mentioned, air-sacs and air-cavities throughout a bird's body, even in its bones and quills, and the air which the spaces contain is necessarily warmer than the surrounding air, and therefore lighter. Many people appear to think that this is enough to explain the whole question, but a little careful consideration is sufficient to show the complete absurdity of such a notion. Supposing there were a difference in temperature between the outside air and the air contained in the air-sacs amounting to as much as 20° Fahrenheit, it would require, in order to make a bird weighing ten pounds light enough to float in the air, something like a thousand cubic feet of warm air in the air-sacs! Such an enormous volume of air would produce, to say the least of it, an unwieldy and unusual appearance such as has never yet been observed in any bird outside *The Arabian Nights*.

Different birds soar in different ways, to different heights, and for different purposes. Many, such as the Pelicans, which move round in gigantic and noble spirals, habitually soar merely for pleasure; others, like the Vultures, ascend to astonishing heights for the purpose of finding food. Condors have been observed from a height of sixteen thousand feet on the Andes soaring practically five miles above the level of the sea, and it is

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possible that even this astonishing height is exceeded. This is more remarkable even than it at first appears, and for this reason: during the famous balloon ascent made by Mr. James Glaisher, starting from Wolverhampton in September, 1862, freezing-point was reached at a height of 2 miles; at $3\frac{1}{2}$ miles Mr. Coxwell, who accompanied Mr. Glaisher, was panting for breath; and at a little over 5 miles Mr. Glaisher himself suddenly lost the power of moving his arms, and soon afterwards became temporarily blind and dumb, though still conscious. Now a number of Pigeons were taken up in the balloon, and birds which were thrown out at a height of four miles flew vigorously round and round apparently quite at their ease, although Pigeons are not amongst the birds which are in the habit of ascending to anything like this altitude. There must, then, be something very remarkable in the constitution of a bird, since it is able to tolerate conditions which cause much physical distress in man.

Gätke states that Buzzards are frequently accompanied on their excursions into the heights by Kestrels, and it is very interesting to watch the birds together on account of the different manner in which they rise. The Buzzard, as already mentioned, ascends directly upward; the Kestrel, on the other hand, careers round and round its companion in circles, or rather, since it too is rising, in a spiral or corkscrew course. But the Kestrel is not a true soarer in the same sense as a Buzzard, for in order to continue its upward course it is obliged from time to time to perform a series of rapid wing-strokes.

The Kestrel is a specialist in the last of the four principal kinds of flight to which we have to refer, namely, *hovering*. Hovering is the very antithesis of soaring, because while in soaring a bird usually keeps its wings motionless, yet moves often in a spiral course to a great height, or sails onward, as we shall see presently, for immense distances, in hovering the wings beat with tremendous rapidity, yet the bird remains

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poised all the while over the same spot. This habit has earned for the Kestrel its popular name of "Wind-hover." It is seen also to great advantage in Humming-birds as they hang motionless under honey-laden flowers and probe them with their long bills, their little wings being driven at such an enormous speed meanwhile that they are only visible as a faint haze on each side of the body.

A certain Bird-of-Prey, known as the Everglade Kite, has a very curious habit when soaring, which appears to be peculiar to itself. While in the air its flight is frequently arrested for long intervals, the bird remaining in one place absolutely immovable with the exception of its expanded tail, which is continually twisted about in a singular manner from side to side, or turned up almost at a right angle with the line of the body. It seems as though by this means the Kite contrived to anchor itself, as it were, in position, and to hover without moving its wings.

Soaring is not necessarily carried on at a great height, and many sea-birds soar but a short distance above the surface of the water. Nearly all of them are remarkably skilful, and Gulls may be seen soaring in all weathers, apparently in almost any direction they please. The soaring of sea-birds is often seen to great advantage from sailing ships in the midst of the ocean, and there are few grander spectacles than the majestic flight of such a bird as the Albatross, as he sails without effort over the sea. At one moment rising high in the air, then with a bold sweep descending until he all but touches the crests of the waves, his body and outstretched wings remain in complete repose, and only his head and neck move to and fro as, ever-watchful and with lively eye, he observes what is going on around him. But suddenly he sees something floating on the water, and then all his grace is lost, for throwing his head back, and straddling out his enormous webbed feet in an awkward manner to their full extent, he comes down with a great splash and a hoarse cry on the waves. Once afloat, how-

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ever, he is himself again, and breasts the waves with grace and ease.

For more than an hour at a time an Albatross may often be seen sailing about without any apparent movement of its wings. In this it is not alone, for the Frigate-bird is no less wonderful—indeed, some people consider the Frigate-bird an even finer flyer than the Albatross. Both these birds may be seen following a ship day after day, and it is even said that they are able to fly for almost a week continuously in the wake of a vessel.

Petrels also follow vessels for several days in succession (especially if offered the inducement of bits of bait, such as fish liver, dropped out astern), even when they are travelling two hundred miles a day, and are often the only visible companions of a lonely ship in mid-ocean.

The flight of Petrels is quite different from that of an Albatross; they are restless creatures, and move around fluttering, twittering, and pattering on the water with their feet in the curious manner from which they have derived their name. For these animated little birds seldom actually alight on the water, even when picking up food; their wings support them just above the surface, and the movement of their legs gives them the appearance of striding along over the sea like Peter of old, hence the name 'Petrel.'

The idea that the birds remain constantly on the wing for several days has, however, often been disputed. It does indeed seem incredible that any animal could remain so long without rest, and it is just possible that the Petrels both rest and sleep on the sea, for where fifty or a hundred birds are seen by day there may be only two or three during the night. But if they do rest upon the water while the ship is still forging ahead on her course, how is it that they are with her again soon after daybreak? The explanation which has been suggested is that they soar to a considerable height, just as Vultures do, and having found the ship again (or some other ship) easily catch it

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up. From the height of only a thousand feet it would be possible for a bird to see a ship with masts two hundred feet high more than fifty miles away, and even if the ship itself were not visible it might catch sight of another bird whose actions showed that it had discovered one, and follow in its train. In whatever way we regard it, however, and whichever opinion we are inclined to, it cannot be denied that the flight of these hardy ocean-going birds is very marvellous.

Such birds as these are in strange contrast to the Steamer Ducks, which when mature are incapable of true flight, their wings being too short to support their body in the air. But though they cannot raise themselves to any height they flap their wings busily as they move along the surface of the waves, producing the effect of a fussy paddle-steamboat, and so rapidly do their wings beat the water that it is quite difficult to believe that they are not really revolving like paddles.

Among the land-birds none show greater endurance in flight than the Swifts, with which we are all familiar. These birds, which in the height of the summer rise very early and are the latest of all the day-birds in going to roost, remain on the wing during most of the time between dawn and twilight, often travelling at an almost incredible speed as they dash hither and thither, at a greater height than the Swallows, hunting for insects or, as it sometimes seems, flying out of sheer enjoyment of the exercise.

CHAPTER XV

MIGRATION

The old hibernation myth : its absurdities and possible foundation in fact—
The gathering of the flocks—Immensity of numbers—Perils of the journey—Extent of the breeding-ground—The Tundra, a birds' paradise—A banquet of crystallised fruit and mosquitoes—Possible origin of the migratory instinct—Punctuality of migrants—"Time gone by, birds gone by"—Height at which migrants fly—The beginning and end of the journey—Speed of migrating flocks—Importance of speed—East and west migration—Finding the way—Partial migrants.

THAT "one Swallow does not make a summer" is one of the very oldest of common proverbial sayings. The mysterious going and coming of birds, their sudden disappearance from the face of the country and their no less sudden return, have excited the wonder of mankind for ages past. Their seasonal movements and wanderings had been noticed even in Homer's time, for he compared the march of the Trojans to the noisy flight of a flock of Cranes travelling southward: "The Trojans marched with clamour and with shouting like unto birds, even as when there goeth up before Heaven a clamour of Cranes which flee from the coming of winter and sudden rain, and fly with clamour towards the streams of ocean." But though the arrival or departure of Cuckoo, Swallow, or many another bird was a familiar occurrence, the mystery of it remained a mystery until quite recent times, and there are still many features about the wanderings of birds which we cannot really explain.

We know that some birds come in the springtime at the season of nesting to make their homes amongst us, and leave again for warmer lands before the beginning of winter; we

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know that others come to spend the winter, but do not stay to bring up their young; what we do not know is how they manage to find their way from countries far distant to the same spot year after year, or even, in some instances, where they spend their time during their long absence from our shores. It is one of the most marvellous things in the whole of nature that the same pair of Wagtails should travel from a place hundreds of miles away in Southern Europe to build their nest in the same wall in which they took up their abode a year before, and that, as there is reason to suppose sometimes happens, the same Cuckoo should come from its remote winter quarters in Africa once more to place its egg in the Wagtail's nest.

Not very long ago it was commonly believed that in autumn Swallows do not leave the country at all, but hide in holes in the ground, in hollow trees, or in snug retreats under the roofs of buildings, there to sleep away the winter months until the spring sunshine and the reappearance of winged insects tempt them to venture once more out into the open. Some people even maintained that these dainty little birds hide at the bottom of ponds or streams and bury themselves in the mud. Gilbert White himself, fine old naturalist as he was, could not entirely rid himself of this absurd notion, though it is obviously impossible that such a hot-blooded, quick-breathing creature as a bird could survive for one single hour under such conditions.

The notion that birds hibernate in holes was, however, more plausible, for it is known that other animals are capable of doing so. Bats spend a drowsy existence during the cold weather in caves, hollow trees, or crevices; butterflies, houseflies, and other insects may often be found in a sleepy, practically insensible condition, concealed in some dark corner; dormice lie snugly coiled up within their nest to await the return of spring; and the hedgehog does not venture abroad during the hard weather. There is an old children's rhyme:—

The Bat, the Bee, and the Butterfly,
The Cuckoo and the Swallow,
The Corncrake and the Nightingale,
They all sleep in the hollow.

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No doubt in the old days if the truth of the popular belief had been questioned the retort would have been—Why should not the Cuckoo and Swallow and Corncrake and Nightingale hibernate? At the present time it requires a great deal of courage to suggest that such a thing is possible in any circumstances whatever, and any one who ventures to do so runs considerable risk of being at once put down as a very credulous and unintelligent person. But is it not, after all, just possible that there was a small grain of fact in the foundation of this widespread fiction?

(We of course know now that migration, and not hibernation, accounts for the disappearance of birds, but there are often a few birds which either are not quite old enough to undertake the flight to a distant country, or which loiter over long in their summer quarters and, being surprised by a snap of cold weather, have their faculties dulled and lose some of the exuberant energy which is necessary for such a tremendous undertaking as a journey oversea. Is it not just possible that from time to time some, though ever so few, of these birds, having crept into a snug corner for shelter, became too listless and drowsy to leave it again, and being found in that condition were not unnaturally regarded as having deliberately stayed to hibernate?

(I happen to be aware that a bird is capable of surviving a very long period of imprisonment without food. Early in January last year, at a farm in Lincolnshire, a Buff Orpington Hen suddenly disappeared and no trace of her could be found for some time. At the end of six weeks exactly, from the date when she was first missed, she was found in an outbuilding, firmly wedged behind some sacks, in a position which made movement impossible. She was very thin, in fact "a mere bag of bones," but though she was both weak and drowsy she was still alive, and it seemed not unlikely that with care she would recover. She was therefore fed on warm bread and milk, but at the end of three days she died. There was no

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food of any kind, or water, in the place where she was found ; not even mice or other vermin which she might have eaten ; yet in spite of this, and in spite of her uncomfortable position, which no doubt caused her to exhaust her strength in struggling to escape as long as she was capable of doing so, she had survived, and during her imprisonment had even laid two eggs. Now if a bird can exist for six whole weeks in such unfavourable circumstances and be found still living at the end of that time, are the old stories of an occasional living Swallow or Swift or Corncrake being discovered in a drowsy condition in midwinter, hidden away in some snug retreat, so ridiculous after all ? especially when we consider that in these cases the birds, not being prisoners, might, if they should be aroused from their lethargy by an exceptionally warm day, perhaps seek a little food which would renew their strength to a certain extent and help them to go on living. To consider that this is possible is a very different matter from accepting the old fairy-tales which affirmed that the birds crawled down the reeds in pairs, bill to bill and foot to foot, to the bottom of a lake ; or that they formed a ball by clinging together with their feet and so committed themselves to the deep ; or that they united in laying hold of a straw and plunged in company ; or—most romantic of all—that they assembled on a reed in such numbers that at length it broke and sank with them while they joined in singing a funeral dirge !

The belief last mentioned no doubt arose from the fact that in autumn, just before migrating, Swallows forsake their roosts about houses or other buildings and assemble every night in myriads, to sleep in trees or bushes or among the slender withies of an osier-bed. Gilbert White himself observed this, for he states that he discerned one morning, on a large common, as the mist began to break away, great numbers of Swallows in close clusters upon twigs, as if they had roosted there all night ; and he saw them actually set out on their southward journey, for he says : “ As soon as the air became clear and pleasant they

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all were on the wing at once ; and, by a placid and easy flight, proceeded on southwards towards the sea : after this I did not see any more flocks, only now and then a straggler."

Nearly all migratory birds travel in flocks, especially in the autumn, and often in such immense numbers as baffle description. These vast companies are nowhere better observed than from lighthouses, towards which they are often attracted by the bright light ; indeed, lighthouses are a source of much peril to migrating birds, many of which dash headlong against the glass of the lantern and are stunned or killed. After a big migration night birds have often been found lying five or six deep all round the lighthouse balcony. In the "Report on the Migration of Birds as observed at Irish Lighthouses," it is stated that after the night of February 20th, 1890, during which the air seemed to be filled with immense swarms of Larks, Blackbirds, Thrushes, Starlings, and Curlews, the balcony outside Copland Lighthouse was piled deep with killed birds, so that it was impossible to set down a foot anywhere without walking on them. The glass of the lantern was obscured to such an extent that eight pails of water were required to clean it, and dead birds were given in whole bucketsful to passing fishermen.

Again, in the following description of an autumn night in Heligoland—that rocky isle in the midst of the North Sea which lies in the course of one of the most frequented of the birds' great highways—Herr Gätke brings vividly before us the wonders of such a mighty, hurrying throng :—

"The whole sky is now filled with a babel of hundreds of thousands of voices, and as we approach the lighthouse there presents itself to the eye a scene which more than confirms the experience of the ear. Under the intense glare of the light, swarms of Larks, Starlings, and Thrushes career around in ever-varying density, like showers of brilliant sparks or huge snowflakes driven onwards by a gale, and continuously replaced as they disappear by freshly arriving multitudes. Mingled

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with these birds are large numbers of Golden Plovers, Lapwings, Curlews, and Sandpipers. Now and again, too, a Woodcock is seen ; or an Owl, with slow beatings of the wings, emerges from the darkness into the circle of light, but again speedily vanishes, accompanied by the plaintive cry of an unhappy Thrush that has become its prey.

“Such a migration stream lasts through a whole long autumn night, and, under specially favourable conditions, may . . . be repeated for several nights in succession. Nor is it by any means confined within the narrow limits of what is known as a migration route, for that which took place in the night . . . in which the birds might have been counted by millions, was noticed 112 geographical miles farther south. When one thinks of numbers of individuals such as these, which cannot be grasped by human intelligence, it seems absurd to talk of a conceivable diminution in the number of birds being effected through the agency of man. In one particular respect man no doubt does exert a noticeable influence on the numbers of bird-life, not, however, by means of net and gun, but rather by the increasing cultivation of the soil, which roots out every bush and shrub, great or small, as a useless obstacle, and thus robs the bird of even the last natural protection of its nest. Having thus driven the poor creatures into distant and less densely populated districts, we complain that we no longer hear their merry song, unconscious of the fact that we are ourselves responsible for the cause.”

To a man who for sixty years or more had witnessed the mighty, hurrying stream of birds which passes over the little lonely island in the North Sea, it no doubt did seem ridiculous to suppose that the yearly slaying of a few hundred thousand of them could make any perceptible difference in their numbers ; yet in this opinion Herr Gätke was mistaken, for as we point out elsewhere, man has succeeded in exterminating by wholesale persecution a bird which not long ago existed in such immense numbers as the famous Passenger Pigeon of North America.

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Large numbers of migrating birds no doubt perish owing to fatigue, and this is not to be wondered at when we consider the multitudes which travel for several hundred miles over sea, and remember that they may be met by adverse weather on the way. Tired birds often alight on boats or the rigging of ships, many of them so much exhausted as to allow themselves to be caught in the hand, and some so weak that, unable to stand, they fall into the water and are drowned. Gätke tells us that the birds arriving on Heligoland never show the least sign of fatigue, though he admits that in two or three instances he had seen land-birds, such as a Song-Thrush, a Snow-Bunting, and a Brambling, obliged to take short rests on the sea. It appears that land-birds may be able to rise again, even after they have fallen into the water; but if their plumage once becomes soaked their fate is sealed, and great numbers of birds undoubtedly perish in this way. In March, 1904, the pupils at Pwllheli County School announced one afternoon that hundreds and thousands of birds had been cast upon the shore at high tide: on inquiry it was found that dead birds were lying all along the coast for several miles, amongst them being Starlings, Thrushes, Blackbirds, Woodcock, and Snipe. During the small hours of the morning many had fallen dead beat upon the deck of a vessel entering the harbour, while others in a helpless and dying condition fell among and upon the workmen in the granite quarries not far away.

Even the birds which come safely to land often arrive in such an exhausted condition that, on alighting upon the beach, they are incapable of any further exertion and fall an easy prey to Gulls, Rooks, and Carrion-Crows, which kill and devour them.

The wonder is that some of the smaller and weaker birds ever succeed in accomplishing the journey at all. A story which used to be told to children was that big birds, such as Storks and Crows, carry the little songsters on their backs across the sea; but this was only a pretty fairy-tale. Though many small birds associate with strange companions on their journeys, the

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tiny Golden-crested Wren, for example, often travelling in the company of the sturdy Crow, hundreds of thousands of them make the crossing with not a single large bird amongst them. During the October migration, some years ago, Golden-crested Wrens were seen in some places as thick as snowflakes in the air all the night through; and on dark nights as many as fifteen thousand Larks have been caught in Heligoland in three hours.

Whence come all these vast multitudes? At first it seems almost incredible that there should be so many birds in the world as are seen from coast stations at migration time. Flocks, many miles in width, pass continuously overhead for hours at a time, and on dark nights when they fly low the sound of their wings and their mingled cries produce an effect which is both weird and uncanny. On such occasions the birds are often attracted by the glow of lights in a town and loiter overhead half the night, heard but not seen. Lord Lilford writes that in the summer of 1858, on the esplanade of Corfu, he and a companion were suddenly startled from the drowsy contemplation of their cigarettes by an uproar as if all the feathered inhabitants of the great Acherusian marsh had met in conflict over their heads. "It would," he says, "be quite impossible to convey anything approaching to a just idea of the babel of sounds, many of which neither of us had ever before heard; and I have no conception what birds can have produced the greater part of them, but I recognised the wails of the Curlew, the cry of more than one species of Tern, and the laugh of some *Larus*"—*Larus* being of course a Gull. All migrating birds are more noisy on dark or foggy nights, because it is only by continually uttering their call-notes that the flock can avoid becoming scattered.

The immensity of some of the autumn flocks of migrating birds is accounted for by the vast extent of the nesting-regions from which the hosts are gathered together. Such a region was discovered by Mr. Seebohm during his two famous journeys

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in quest of the nesting-place of some of our winter visitors—the Grey Plover, the Little Stint, Bewick's Swan, the Sanderling, the Knot, and the Curlew Sandpiper, which vanished every spring as completely as if they had ceased to exist, yet regularly reappeared on our shores in the autumn. To what unknown or unvisited land did they repair?

On the northern rim of the European and Asiatic continents, where furthest Russia and the vast stretches of Siberia extend without a break along the shores of the Arctic Ocean, there was a tract of thousands of miles of country concerning which practically nothing was known—a region which was believed to be wholly uninhabited; a land of treeless swamp, and darkness, and desolation. At one point, opposite Nova Zembla, a mighty river, the Petchora, flows down from the Ural Mountains into the ocean; and thither Mr. Seebohm determined to go in quest of the missing birds. There he found three of them; the others are now known to go still further north.

Nothing could be more romantic than the story which this journey of Mr. Seebohm's revealed. For eight months out of the year the belt of inhospitable land—the *tundra*, as it is called—between the northern forests and the frozen ocean, is completely buried under a six-feet-thick blanket of snow, and not a sign of life is to be seen except here and there the footprints of a fox or reindeer, or an occasional hardy Raven or Owl which has wandered from the forest. For two months in mid-winter the sun never rises above the horizon; night holds undisputed sway, night made visible by the fitful light of moon or stars or the faint gleam of the aurora borealis. Then the sun begins to peep upon this desolate scene for a few minutes at noon; gradually, day by day, he prolongs his visit, until, in early June, continuous night has become continuous day. At midday the sun's rays are hot enough to blister the skin, but for a time the frozen snow holds out against their influence, and they are reflected harmlessly from the great white expanse. Then a more subtle adversary comes to join in the struggle—

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the warm south wind and, with it, rain. The six-foot ice on the mighty Petchora crumples and breaks, the snow melts away, and earth is revealed and aroused from its long slumber, and it is summer—a two-months-long summer day. With the breaking of the ice come the birds, suddenly and in countless millions, some of them in so great a hurry that they overshoot the mark and are obliged to turn back. Within forty-eight hours of the first warmth they have taken possession of the land—Snipes, Dotterels, Ducks, Swans, Geese, Gulls, Pipits, Birds-of-Prey, and hosts of others. What do they find?

A great plain with shallow valleys, and swamps intersected by a network of low ridges, like the veins on the rind of a melon; a plain which is “neither heath nor moor, marsh nor fen, highlands nor sand-dunes, moss nor morass,” but a combination of all. At midday the blazing sun converts a thousand pools into sparkling jewels; at midnight its blood-red disc throws a rosy haze on the landscape and casts flaming crowns on the low hill-tops. But what food can there be for a teeming population of birds after an eight months’ winter, when the earth is yet hardly freed from its covering of snow? Strange to say, there is food in abundance: nowhere in the world does Nature provide such a lavish prodigality of food. Myriads of cranberry, cloudberry, and crowberry bushes cover the ground, all laden with enormous crops of fruit, ready for eating.

It seems incredible that there should be such stores of food; but the explanation is simple. Short as is the Arctic summer, the perpetual sunshine forces on the vegetation and brings the stunted, berry-bearing shrubs to fruition. Hardly has the fruit ripened, however, when winter again sets in, and a great mantle of snow is spread over all the land, not to melt again for eight months. The bushes are buried and frozen with the fruit still hanging upon them before the birds have time to gather it; and there it remains, in cold storage, fresh and succulent until the south wind and summer sun uncover it for the birds to feast upon the moment they arrive from their winter quarters.

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Long before this store of crystallised fruits is exhausted the bushes have begun to bear again, and the tundra is converted into a gigantic garden. "The lakes," Mr. Seebohm says, "are diversified with patches of green water-plants, amongst which ducks and swans float and dive; the little rivers flow between banks of rush and sedge; the swamps are masses of tall rushes and sedges of various species, where phalaropes and ruffs breed, and the bogs are brilliant with the white fluffy seeds of the cotton-grass." The ground is a mass of beautiful and varied colour, in which lichens and moss of every conceivable hue are interspersed with bonnie bright Arctic blossoms—monkshood and pinks, yellow pansies and dwarf roses, willow-herb, blue-bells, lady's smock, Jacob's ladder, sedum, and graceful anemones. The air is fragrant with their odours, and the land would be a veritable paradise but for one fatal drawback—*mosquitoes!*

Rats in Hamelin Town before the visit of the Pied Piper were not so all-pervading as mosquitoes in the tundra. Nowhere in the world is insect-life so prolific; their numbers beggar description. As soon as the snow is thawed, the latent mosquito life begins to stir. Eggs buried in the frozen mud now hatch; in a few days there are mosquitoes, and thenceforward generation is heaped on generation until every blade of grass and twig, stem of moss or tiny leaf, reed or bush on fen or hill seems to produce an inexhaustible supply. No European can exist among them without a veil; they cover the gun-barrels and rise in battalions, like a black cloud, to obscure the sight. If a man remain standing, the cloud thickens about him; if he run, it trails behind like a smoky veil floating in the wind. The sound of their buzzing is like the singing of a tea-kettle. In tropical lands they swarm only by night; in the tundra, they swarm incessantly for six weeks or more. They are its most important inhabitants, for they make the land almost intolerable to man, while they enable fish and birds to live. The soft-billed insect-eating birds have only to open their

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mouths to fill them with mosquitoes ; no wonder then, that they, as well as the fruit-eating birds, descend upon the country in myriads ; for them, at least, the land is a paradise.

The birds arrive already paired ; they have no time to waste, for their summer life is compressed into a few weeks, so they begin to build at once and devote themselves wholly to their parental duties. When the education of their young is complete they cast off their worn-out garments and, clothed in new feathers, hurry away, some to the south and some towards the south-west, where they form a large part of the mighty autumn stream which passes over Heligoland and surges round our lighthouse stations.

The breeding-ground is always in the coldest regions of the bird's range. Birds which nest in the tropics do not migrate, because there is no warmer region for them to migrate from ; and this brings us to the question as to what is the origin of the instinct for migration.

The migratory instinct perhaps arose in this way : we suppose that ages ago the ancestors of migratory birds lived all the year round in the countries to which their descendants now resort to make their nests ; gradually, however, the climate changed ; it grew colder, and in winter food became scarce, and the birds were compelled to travel southwards. But all birds have a fondness for their old home ; so with the spring and the return of warmer weather they went back to the familiar breeding-place. As the climate and the geological conditions continued to change, the distance between the original homeland and the summer quarters gradually increased, and the habit of moving to and fro with the seasons became more firmly established and was handed on from generation to generation, until it became a fixed instinct. The joys of family life became associated in the bird-mind with the annual journey to the northern home as surely as in the minds of some children the joys of summer holidays are inseparable from a journey to the sea.

We know that the migration of birds is instinctive, and that

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it is not merely a habit learnt by the young from their parents, because the young of the year usually start several weeks in advance of the old birds; and as they often leave while the weather is still warm and food plentiful, they are not urged to undertake their first great flight by hunger.

Few birds undertake the journey alone—unaccompanied, that is to say, by others of their own kind. The Cuckoo often does, and the Woodcock and the Nightjar; but as a rule birds unite into parties before starting on their pilgrimage. The departure is often delayed by bad weather, and while one party is waiting until the conditions are good for crossing, other parties of different species arrive at the starting-place, with the result that the company becomes strangely mixed.

So strong is the impulse to be moving towards the nesting-place, however, that the weather produces far less effect on migration than might be expected. Swallows and Nightingales are sometimes delayed, but most birds are very regular in their goings and comings, and the punctuality of some species is so wonderful that it almost appears as if they arranged their movements with an eye to the calendar. "Time gone by, birds gone by" is a saying amongst Heligoland gunners, who have learnt from long experience that if certain birds are not seen at the proper time it is because they have passed by unnoticed, and that they will not be seen later however favourable the conditions may be. The observation is a very ancient one, for in the book of the Prophet Jeremiah we read that "the stork in the heaven knoweth her appointed times; and the turtle and the crane and the swallow observe the time of their coming." The Persians and the Arabs even went so far as to compile portions of their calendars from the times of arrival and departure of migratory birds.

All sea-fowl may be relied on to make their appearance about the same date year by year, and Puffins repair to their summer quarters with astonishing punctuality, whatever the weather may be. Swifts are almost equally regular in their departure

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from England in the earliest days of August, leaving earlier and arriving later than either Swallows or Martins.

The autumn movement is, however, less regular than that of the spring, and is hastened by the approach of stormy weather. It has been noticed that when the barometer is falling, the rush of birds increases; indeed, to some extent it is possible to foretell the weather by watching the birds. This is especially the case in districts where food is still fairly abundant, for in ordinary circumstances many birds proceed through such a country in a leisurely manner, loitering wherever bushes and thickets hold out the promise of a much-needed meal. But when the birds feel a something in the air which foretells the coming of wind and storm, they seem to realise instinctively that it is no time for dallying, and hold sturdily to their course without pausing in their weary flight.

Most birds fly at a great height when migrating, especially in clear weather and on bright, moonlight nights. Rooks, Chaffinches, and Sparrow-Hawks ascend to such an altitude that they look like dust in the sky and can only be recognised by their cries. Cranes, whose dark plumage shows up well against a clear sky, rise to a height which can hardly be less than three miles, for they fly almost beyond the range of vision, although their outspread wings measure seven or eight feet from tip to tip; and in Morocco, in the springtime, I have heard the clatter of Storks passing so far overhead that not a bird was visible.

Crows, Starlings, and Larks, on the other hand, usually fly but a few hundred feet above the sea.

On their departure, Cranes, Sparrow-Hawks, and Kestrels rise in a mighty spiral, while Buzzards mount straight up. Swifts and Swallows practise soaring and flying in flocks a few days before setting out. The departure of birds is less often witnessed than their arrival, but Thrushes, Robins, Hedge-Sparrows, Goldcrests, and others have often been observed when leaving Heligoland. Soon after sunset a single bird rises from the flock and calls loudly to its companions, who arouse them-



A "MISK O' DUCKS" CROSSING THE MOON

A scene on the Norfolk coast. When flying in flocks, Wild Ducks arrange themselves in the form of a > or ξ, with the leader at the apex.

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selves and fly almost perpendicularly, with upturned breast and powerful strokes of the wings, occasionally moving in a circle, and all joining in a chorus of call-notes. As soon as fresh arrivals cease to join the flock the voices are silenced, and the whole company darts away.

The way in which the birds descend from the sky is more striking. Many species precipitate themselves with a rushing sound like that of a sky-rocket, and at almost incredible speed. The sound is heard before the birds are visible: on looking upwards a black dot is seen; almost at the same moment it shoots past in the form of a bird, and you look to see it dashed to pieces on the ground, instead of which you find it sitting quietly as though it had never been on the move. Occasionally there are accidents; a Fieldfare was once found at the Heligoland lighthouse impaled on the lightning-conductor, on which it had descended with such force in the darkness that the rod had passed through breast and back and the bird was completely skewered.

There is some difference of opinion concerning the speed at which the flocks travel, but there is no doubt that it is very great. During the migration of Hooded Crows one spring the first flocks arrived at Heligoland at eight o'clock in the morning and on the east coast of England, three hundred and twenty miles distant, three hours later, so that they appeared to have travelled more than a hundred miles an hour; yet Hooded Crows are comparatively sluggish fliers. We cannot of course be quite sure that the flocks arriving in Heligoland and those which reached England a little later were either the same birds or birds which had set out at the same time.

We can, however, observe the actual time which a flock of birds take to fly a short distance between two known points and so estimate their speed pretty accurately. By doing this, Herr Gätke found that Plovers, Curlews, and Godwits travelled 22,000 feet, or over four miles, in a minute! Even if we make allowance for a considerable amount of error in observation, it

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is evident that the speed must be very great. In the days when Passenger Pigeons still frequented the United States in great numbers, the crops of some of these birds shot in the neighbourhood of New York were found to be full of rice which they could not have obtained nearer than the rice-fields of Carolina and Georgia, from 350 to 700 miles away; and unless the birds' digestion during flight is much slower than at other times their average speed must have been about a mile a minute. Such a velocity is only possible in the rarefied upper atmosphere in which the birds travel. By ascending to a great height they not only rise above the region of great storms, but are able to attain a higher speed.

The importance of speed is obvious when we consider the immense distance which lies between the summer and winter quarters of many birds and the wide expanse of sea which some of them cross in their course. A thousand miles or so is a very modest journey for a migrant, the greatest range of these little travellers being about ten times that distance. Richard's Pipit, a bird which occasionally visits England, nests in the far-off country to the east of Lake Baikal and spends the winter in the south of France and on the Atlantic coast of Spain, travelling from one end of the Old World to the other. A glance at the map will show that these birds, though they travel thousands of miles, are not much further south at the end of their journey than when they set out. From this we learn that there is an east and west migration, as well as that from north to south, and if, instead of referring to an ordinary map, you will look at a climate chart, you will at once see the reason. Climate does not depend merely on latitude, and a bird which cannot face the hard winter of Siberia can find a more genial clime either by flying to Western Europe or by moving south.

The homeward journey—that is to say, the journey to the nesting-place—is not always made over the same route as that followed in the autumn. When going into winter quarters, there seems to be no special reason why the birds should be in a

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great hurry—except, of course, when crossing the sea—so long as they keep ahead of the advancing region of famine. But in spring they have more urgent business to think about; the nesting instinct is aroused, and they hurry forward as fast as they can by the shortest way. Birds which in autumn make a little tour, calling at Heligoland and England, and then wandering on through France and Spain to North Africa, in spring take the direct route back to their Siberian home.

Now these birds have to find their way between two places which are thousands of miles apart, over two entirely different regions, and how they manage it nobody knows, though all kinds of explanations have been suggested. It was formerly supposed that the old birds act as guides; but in most cases the young birds are the first to leave, and very often they start several weeks before their parents. Perhaps there are nearly always a few old birds in the flock; or perhaps the young ones loiter by the way and are overtaken by their experienced elders.

Sometimes they travel in company from the first; Swallows at all events do so, and old Bernacle Geese have been seen piloting parties of young on leaving the Hebrides. But even if we admit that there *may* be several old birds in most parties—and we do not know that there are—this explanation is of very little use to us if the young of even one kind of bird travel alone. Now we are quite sure that there is one species of which the old birds do not act as guides, and that is the Cuckoo. Other birds stay to look after their offspring, but Cuckoos are not detained by family cares, because they make arrangements to board out their young, and their sense of responsibility is satisfied when they have distributed their eggs in the nests of other birds. Long before the young are able to set out on a journey the parents go away and leave them to find the way as best they can. Here, then, we meet with the same difficulty again: how *do* they find the way?

It does not help us much if we say that they are guided by instinct, because we shall still want to know *how*. It has often been stated that savages—Bushmen and American

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Indians, for example — have a ‘sense of direction’ which enables them to find their way even in a district which is strange to them, and they have been known to perform wonderful feats in getting from place to place.

A man who spends most of his life in the open does not get lost as easily as a town dweller, because his senses of hearing and sight are quicker, and in the savage whose ancestors have never lived in cities they are still more acute. Some people think, therefore, that a savage has a sense of direction only because he is more alert to read nature’s signposts, and is so much accustomed to guiding himself by little signs that are unknown or invisible to civilised men that he can follow their directions as unconsciously as you or I might keep to some long-familiar road. Even if that be so, what shall we say of quite young children whose experience must be slight compared with that of their elders, but who yet are able to find their way about in an unknown country with a certainty quite beyond our understanding? Mr. Schillings tells us of a Masai child, barely six years old, who was lost from his camp in African wilds, and who made his way home safely to his parents’ kraal two long days’ journey through a pathless jungle, in which he slept by night.

In some animals the faculty is still more wonderful. What is it that guides a dog which, after a railway journey of many miles in a closed van, walks home again, though he has not been able to see where he was being taken, and has therefore no landmarks to guide him? Here, at least, we seem forced to believe that there is some inborn faculty which we do not possess and cannot explain.

Homing Pigeons are often quoted as an example of birds which are known to have a sense of direction, because they too are frequently whirled away in the train to some distant place from which, on being set free, they return safely to their cote. But Homing Pigeons are specialists; they are trained stage by stage for longer and longer flights; or in other words, they learn their way by experience. When thrown up they

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ascend to a considerable height, from which they obtain a bird's-eye view of an immense stretch of country, and take their bearings before starting away towards home. But what experience has a young Cuckoo, born in an English park, of the way to Africa? Or, more wonderful still perhaps, what knowledge has a Cuckoo, born in New Zealand, of the way across the thousand miles of trackless ocean which lie between its native country and the Australian continent where it makes its winter quarters? Sight no doubt helps birds to direct their flight from point to point, but it cannot help them much in mid-ocean. It is true that many birds seem to lose their way on dark nights, but perhaps that is only because they are confused by the glare of a city or lighthouse when nothing else is visible. In the end we must confess that, much as we have learnt concerning bird-travellers, we have not yet discovered the secret of that mystery of mysteries, the instinct or knowledge which guides them to their journey's end.

Flight is such a conspicuous feature of bird-migration that one is apt to overlook the fact that there are migrants even amongst the flightless birds. During the voyage of the *Scotia* to the Antarctic in 1904 a large party of Gentoo Penguins was observed landing on the South Orkney Islands, where they go to nest. Dr. Harvey Pirie says it was a fine sight to see them marching up from the open water on the north of the island like a regiment of soldiers, and when they came to an ice slope, tobogganing down on their breasts. Many of them stopped to scrutinise their unaccustomed visitors, but "with a stare and a shake of their stupid old heads they soon passed on."

When the *Discovery* was in the Antarctic a year or two earlier, the members of the expedition were greatly puzzled, on returning to the Emperor Penguin's nursery after a short absence, to know what had become of not only the old birds, but the downy chicks which had been there a fortnight before, and not one of which was now visible. How they could have got away remained a mystery until the following year, when Dr. Wilson was so fortunate as to observe the means by which

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they leave their birthplace to migrate northwards. Day after day parties of birds with their young started out from the penguinery and stood in groups near the edge of the ice-sheet, where they waited patiently until the piece of ice on which they were stationed broke away and floated slowly over the ocean. In this manner batch after batch of emigrants sailed from their native shore and no doubt made a voyage of many hundreds of miles, at the end of which the chicks would have had time to grow their adult plumage and would be in a position to look after themselves.

Migration does not always involve great journeys such as we have described, nor is it in all cases complete, as with Swallows and Cuckoos. There are partial migrants, like the Crows, Robins, Larks, and Thrushes, which travel to and fro, but some of which are always with us, though not necessarily the same individuals. The number of Robins in a particular locality may be much the same all the year round, fresh arrivals from the north taking the place of those which cross the Channel to winter in France. A few birds, especially among those which haunt the neighbourhood of houses where they can rely on a regular supply of food in hard times, lose the wander-spirit almost entirely. Most people can recall a half-tame Robin which seemed to have attached itself definitely to the domestic establishment, visiting the garden or courtyard for its daily rations through the winter months and migrating, if at all, no further than to the neighbouring shrubbery to build its nest.

Other birds, less favoured, must travel or starve, though they can find—if they are sufficiently alert—enough to eat in some part of the country all the year round. Thus the Kingfisher must leave his summer fishing in a stream or pond and hurry away at the first sign of frost to the great estuaries or seashore; and if he delay overlong he is quite likely to die of hunger before he gets there. Between stay-at-homes or modest travellers such as these and the rangers over broad ocean and continent there are wanderers of all degrees.

CHAPTER XVI

BIRDS IN SOCIETY

The social instinct—"Birds of a feather"—True societies and unsociable flocks—Why large Birds-of-Prey are unsociable—Rooks at work and play—Sentinels—Why Rooks form rookeries—Rookeries and penguineries—Rook pioneers—Altruism among birds—Rescue parties—Birds-of-Prey mobbed by small birds—An Owl as a decoy—A bird philanthropist—Winter flocks—Nesting colonies of Weaver-birds—The Sociable Grosbeak—Hundreds of nests under a single roof—Nests which are shared by several pairs of birds.

WHEN a boy I was much perplexed to know why some birds were nearly always seen in flocks, while others preferred to wander about in solitude or perhaps with only one companion. Why did I nearly always see Rooks associating in a large company, but Crows usually solitary or in couples? Why were the winter hedgerows made lively by flocks of Linnets which suddenly took flight with one accord and hurried away with their curious dipping movement to some distant bush, while other birds, such as the Robin, seemed to be invariably alone? The question certainly was a puzzling one, and it must be confessed that no quite simple answer can be given to it.

The reasons for birds' social habits are many and varied, and cannot always be discovered. There is no doubt that love for the society of their fellows is an instinct with which many species are endowed, or which becomes developed—unfolds itself, we might say—in the very earliest days of their life, and it is not always easy to ascertain the meaning of an instinct or the manner in which it arose. Let us take a very simple example of this. You must often have noticed that your dog or your friend's dog before lying down curves his

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body and turns round once or twice. Now if we were acquainted only with domesticated dogs we could not possibly know why he does this; there seems to be no reason for it. It is safe to assume, however, that no habit is really meaningless. If it has no real value at the present time you may be quite sure that at some former time, and in some other circumstances, it served a good purpose and was of use to the animal. Darwin pointed out what is the real explanation of this round-about movement of a dog before lying down: in their wild state dogs often make their bed in the midst of long grass and, in order that they may lie quite comfortably, turn round and round so as to press down the grass in the form of a cosy hollow. Had we been acquainted only with domestic dogs, which are under no necessity to do this, we could never have been quite sure what was the meaning of a habit which has so long survived its original purpose.

Now we are well aware that birds are wanderers, and in many cases we know very little about what they do during a great part of the year, or what are the conditions in which they live. The conditions, too, often change as years go by, while an instinct once developed, or the habit of a species once formed, changes very slowly, just as in the case of the dog mentioned above. It is not to be expected, therefore, that we should be able, while our knowledge is so incomplete, to explain all the social habits of birds, but the meaning of some of them is quite clear, and without troubling ourselves too much with the scientific side of the question we will try to show, or to suggest, why birds behave as they do in society. If we were going to be really scientific we should have to distinguish clearly between what is true instinct with its manifestations and what is habit—what a bird begins to do quite unconsciously and the actions which it first learns to carry out consciously but afterwards comes to perform automatically; that, however, would make the question too difficult to be dealt with in a book which does not pretend to be scientific.

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That love for the society of their fellows is really instinctive in birds, you may see for yourselves if you carefully observe the poultry in a farmyard. Sometimes eggs of Hens and Ducks or Turkeys and Geese are hatched together under the same mother, but very soon after the chicks begin to run about they display their natural instinct of sociability, and before they are many days old the "birds of a feather flock together," chicks with chicks and ducklings with ducklings; which is no doubt very puzzling to the old bird who is mothering them all. The social instinct is much stronger among web-footed birds, like Ducks, than amongst Game-birds, of which domestic Fowls are representatives, and it is much stronger amongst some of the web-footed birds than others, resulting in societies large or small, a little covey of Ducks or an immense colony of Petrels or Gannets.

The size of the society, however, is not by any means always proportionate to the spirit of true sociability which exists amongst the birds; you may have quite a large flock without as much affection amongst them as exists between two birds which are content to pass their lives together without any further companionship: indeed, there may be very little more fellow-feeling between the members of a flock than there is between the herrings in a shoal, and that is practically none; so it would be possible to distinguish between mere collections of individuals and true societies. Amongst ourselves there are people who cannot endure to be alone, but who are by no means sociable, and so it is amongst the birds; some of them like to be surrounded by their own kind, though they have no kindly feeling towards them. Perhaps it is that they want to be amused — that they would feel dull if they were left alone; as a rule, however, amongst birds we can discover that there is some benefit, some clear advantage, which they gain by living in society; or, if they are solitary, by living in solitude. Let us illustrate this by a few examples.

The larger Birds-of-Prey will seldom tolerate the presence of

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neighbours of their own kind, or even that of their own offspring, for they drive the young birds away from their haunts as soon as they are able to shift for themselves. Now the Birds-of-Prey live by hunting, and if there were many of them in the same neighbourhood there would not be enough game to go round; it is therefore absolutely necessary for their well-being that they should not be troubled with competitors if they are to obtain sufficient food to supply their own needs. In contrast to these birds there is our friend the Rook, whose food usually consists of the worm in the ploughland or the wire-worm in the pasture (when he is not stealing the farmer's grain from the stack or the sown field); whatever he may fancy at the moment is to be found in sufficient quantity to satisfy almost any number that may settle down to the banquet. The birds would therefore have nothing to gain by living apart or in pairs; there is no reason whatever why they should not join together in large flocks, and they gain distinct advantages by doing so. Rooks form what is perhaps the very highest type of bird society, and they belong to the most intellectual of families, that of the Crow. None of our common native birds are more interesting and entertaining than they, as all who have observed them will agree.

Let us, in imagination, watch a party of Rooks at their day's work. First of all in the grey dawn they start a cheerful conversation of caws, and appear to be holding council together before setting out for their feeding-grounds. As soon as this consultation—or perhaps it is merely a morning greeting—is over, one or two grave-looking birds mount into the air, hover there for a moment, and then start on their flight towards the place where breakfast is to be found. The choice of place appears to rest with the leaders, who are no doubt often influenced by the weather conditions. It has been observed, for example, in certain parts of Anglesea, that the Rooks which in fine weather usually fly across the straits to feed upon the jetsam and little marine animals, such as mussels, on the Carnarvonshire shore, do

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not undertake the crossing if there is prospect of stormy weather, but turn inland to other hunting-grounds on the island. Sometimes the birds fly an immense distance—it may be ten miles or more—before settling down to feed, thus showing their wisdom in not exhausting the food supply of the immediate neighbourhood. As they pass onward one or two of the old birds alight, let us say in a ploughed field; immediately the other members of the flock follow suit, and soon all are busily occupied in picking up their breakfast. Not *quite* all of them, however. Let a man carrying a gun approach the field; he will not get within range before an old sedate-looking bird, posted on some point of vantage, utters a warning caw, and immediately all the hungry birds raise their heads to ascertain the reason. If the gunner pass by they quietly resume their feeding, but if he continue to approach, with a great flapping of wings and loud protesting caws the whole flock will take to flight and hurry away until they are well out of danger. Now this is one of the most remarkable developments of the social habits of birds—a wise division of duties which leads one or two members of a flock to post themselves as sentinels and keep guard over their fellows while the latter feed in security. From time to time the sentinels are changed and the birds which have been on guard take their turn at feeding. If you consider for a moment what it must mean to the hungry birds who are content to watch their companions enjoying all sorts of dainties while they remain on duty for the common welfare, you will realise what a marvellous degree of social instinct it represents. We shall learn a little further on that many birds of different species adopt the same practice.

In the evening, when the sun is sinking low and the trees stand out in dark silhouette against the sky, the Rooks begin to come home; first in small bands, from which a solitary bird detaches itself from time to time and turns back as if to make sure that the others are following; then in mighty rushing flocks, whose confused cawings are often mingled with the

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sharper note of the Jackdaws which so frequently live in company with the Rooks; until at last the whole colony has gathered together and is wheeling round and round amidst a deafening babel of sound. At last they begin to settle down upon the trees, perching one by one or in small parties upon the topmost branches. Each bird is anxious to secure an advantageous position, and in their excitement the whole multitude rise again and again and take short flights, all the while uttering their hoarse caws. At last the tumult shows signs of subsiding and the birds may be seen standing out sharply against the sky on every available bough, looking about them or preening their glossy plumage. But the lull is only a temporary one; before they have finished their toilet some of the more boisterous spirits push their companions off their perches and compel them to seek refuge elsewhere, and it is long before, finally, all is silent.

Very often when the young are able to fly, all the birds in the rookery, young and old alike, join together in social flights above the nesting-trees, for mere amusement. They wheel round and round, buffeting each other in the air and engaging in various boisterous and high-spirited antics. The importance of play—and these flights are a form of play—has already been explained in another chapter. Frequently they indulge in the game known to country people as ‘shooting’—that is to say, dropping at a great speed in a zigzag direction with their wings slightly raised above the back—and the countryside affords few grander sights than that of a flock of Rooks indulging in this sport.

Rooks exercise a very careful supervision over the growth of their colony, and often protest vigorously against any innovations of which they do not approve; they appear particularly to object to any extension of the bounds, and are not at all inclined to encourage the ideas of enterprising birds which seem disposed to open up a new suburb, so to speak, by building in a tree which is not already included in the rookery.

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To understand why this is so we are driven to inquire what are the advantages of a colony; why, in short, do Rooks form rookeries at all? There can be little doubt that the chief benefit which they derive from their close association is mutual protection from possible enemies. Few Birds-of-Prey will venture to approach a large company of birds which form a true society: the case is different when the social instinct is weak although the colony is large. We describe elsewhere, for instance, how Penguins which form larger colonies, perhaps, than any birds still existent, have living in their very midst the pirate Skuas, which can carry on their depredations without the slightest fear of combined attack from the birds which they victimise; for this reason the Penguin term *rookery*, which is commonly applied to colonies of these birds, seems to me to be a particularly unhappy one; it would be much better always to speak of them as 'penguineries.' No Bird-of-Prey would ever dare to enter a rookery, for he would undoubtedly be severely punished for his intrusion. It has been suggested that the great enemy against whom Rooks have to guard is their wily and outlawed relatives the Carrion-Crow, who is always ready to take advantage of an opportunity to make a luxurious meal of the eggs or young of other birds; and that is very probably true. One can imagine a rookery as being always more or less in a state of siege, and in order to guard most effectively against incursions of the besieging Carrion-Crow the safest plan consists in concentration. It would give the birds far more trouble if they had to look after outlying nests. The Rooks evidently think so, and if a new nest has been started of which—after much cawing, as if in council—they do not approve, they fall upon it and pull it to pieces.

There are many instances of this proceeding, and I am indebted to my friend Mr. Pattison Muir for one which he observed in the rookery in front of his own house at Cambridge. Early one spring a pair of Rooks left the rookery and crossed the road to start a colony of their own. Their nest was not

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very far advanced before ten or twenty of the more conservative Rooks made a raid upon it and with very little fuss pulled it to pieces, using the sticks for their own nests. The enterprising couple, however, were not discouraged, for after an hour or two they began building again; but once more the other Rooks destroyed their work, this time after considerable progress had been made with it. In ten days as many nests were built and destroyed. But the birds from the old rookery had to deal with a most determined young couple, and still more nests were built. By the time the twelfth had been put together the attacking party appeared to be growing weary of their efforts, and they pulled it to pieces very slowly, although the owners were absent at the time.

The following day, as usual, another nest was built, and it seems to have been carefully guarded, for two days afterwards not only was it still intact, but it apparently contained eggs; at all events the hen-bird was sitting on the nest all day. Occasionally a few visitors went over from the old colony, but they did not meet with a friendly reception; which, I think, was hardly to be wondered at in the circumstances. Whenever they approached, an angry bird appeared from the nest and pecked them, with the result that they at once retired. For a fortnight the new home was successfully defended, but one day at the end of that time, while the owners were absent, the other birds again began removing sticks from the nest, and within forty-eight hours not a twig of it remained. It seemed as though the persecuted pair had at length become discouraged by the continued disapproval of the society to which they belonged, and had towards the last carried on their defence with less energy and conviction. At all events the opposition proved too strong for them, and in that year the attempt to found a new colony was unsuccessful. As in the case of many human innovations, however, the efforts of the pioneers bore fruit later on, for in the following season several nests were built in the tree which had hitherto been tabooed, and were occupied

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without signs of protest from the members of the original colony. Year by year they increased in number, and at the present time the new colony is almost as large as the parent rookery from which it sprang.

As soon as the Rooks have finished building their nest the male bird brings little offerings of food to his wife, who receives them with fluttering wings and subdued sounds quite different from the ordinary caw. This gallantry is continued throughout the whole time of incubation.

A feeling of kindness and courtesy towards their fellows is often exhibited by these birds, and there are many stories of them helping comrades in distress. Sometimes in winter, when food is very scarce and less robust birds suffer severely from hunger, their hardier companions, on discovering an appetising morsel, will carry it to those who are less able to hunt for themselves. There are many stories of such incidents, and several other species of birds are in no wise inferior to Rooks in this sort of gentle behaviour. Occasionally it is a comrade who has become blind through accident or old age who is cared for.

Some years ago on an old farm in Wisconsin attention was attracted by the notes of a Blue Jay (*Cyanocitta cristata*), different from the ordinary cry which is so frequently heard where Jays are numerous, resembling rather a series of regular calls, which appeared to be answered from a tree not far away. Curious to know what was the meaning of these cries, the observer went to the spot whence they proceeded, and there found an old Blue Jay perched on the top of a fence, and several other birds of the same species in the neighbouring tree. As he drew nearer the cries became shrill as if in warning. The bird on the fence proved to be at least partially blind, for his eyes were dim and the lids were nearly closed; in fact he was evidently a very old bird, with faded feathers, dull bill, worn claws, and a generally ragged and unkempt appearance. He was easily caught, and at least a dozen of his fellows showed a

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sympathetic interest in what was going on. On being liberated again he flew towards the place where the other birds were calling and managed with some difficulty to find a resting-place on a large branch. He remained in the neighbourhood for a whole week, accompanied by several companions, whose loud cries always warned him of approaching danger and served to guide him daily to a spring where the whole party went to bathe. During this time he was constantly fed by his comrades, who cared for him as they would have cared for their own nestlings earlier in the year.

Birds which have been captured and caged have in many instances been known to receive kindly attentions either from fellow-captives or from other birds still at liberty. For example, two Blackbirds were at one time caged at a lodge in Richmond Park, one of them a bird which had been caught quite young and had become reconciled to confinement, the other an older bird which had been taken much later in life. The latter, being unaccustomed to captivity, became mopish, refused to eat, and probably would have died had not its younger companion taken pity on its miserable condition and brought it food in its bill, a friendly office which was performed assiduously for some time.

More curious still is the case of a young Cuckoo which had been born in a Wagtail's nest in a garden wall, from which it was removed and transferred to a cage on the top of the wall. Usually the birds which are victims of the Cuckoo's habit of foisting its eggs upon others treat with extraordinary affection the unlovable youngsters which emerge from them, and which heartlessly heave all their foster brothers and sisters out of the nest. In this instance, however, the Wagtails took no further notice of their unbidden guest; perhaps they realised that he was an alien, and were not sorry to have him removed. However that may be, the little Cuckoo was not wholly deserted, in spite of their neglect, for a Hedge-Sparrow took pity on him and brought food to his cage every day until, being fully

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fledged, he was set at liberty. One could without difficulty quote scores of similar examples.

Quite the most extraordinary instance of altruism among birds with which I am acquainted is that related of Terns by Thomas Edward, the famous Scotch naturalist. Being out one day with his gun, Edward shot a Tern which was fishing, bringing it down with a broken wing. The report of the gun and the screams of the wounded bird attracted the attention of the feathered fishing-party to which the unfortunate one belonged, and soon a great number of them were circling over him as he lay upon the waters drifting shorewards with the flowing tide, and were expressing their indignation by flying in a body towards the gunner and uttering loud screams, quite regardless of their own individual safety. The wounded bird drifted in towards the spot where Edward stood waiting for it on the beach, and was already near enough for him to see that it was a fine full-grown specimen when, to his utter astonishment, two of its unwounded comrades seized it by the wings and fairly dragged it out of the water, bearing it seawards. Their burden, however, was too heavy to be carried for more than a very few yards, but other members of the flock came to help, and the wounded bird was eventually conveyed to a rock some distance away. Edward followed them there with the intention of recovering the injured one, but the whole flock swarmed about him and as he neared the rock his prize was once more unceremoniously snatched away. This he could easily have prevented, but it is not surprising to learn that in the circumstances sentiment would not permit him to interfere.

The impulse to fly to the rescue of a comrade in trouble is fairly widespread amongst birds. I can recall more than one such case of a Rook or a Crow rescuing its partner from a Hawk, and I recently read, in an old number of the *Journal* of the Asiatic Society of Bengal, of a party of Jungle-Babblers (*Crateropus canorus*) performing a similar action. These birds are commonly known in India as 'the seven sisters,' on account

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of their habit of invariably going about in small parties. A young trained Hawk, or Shikra, was flown in a garden at a Babbler, which was flying across from one tree to another. The Hawk struck her quarry after a short chase and brought it to the ground, but no sooner did the rest of the party of Babblers hear the cry of their captured sister than they flew to the rescue without the slightest show of hesitation and in less time than it takes to tell had engaged in a spirited attack on the Hawk, who was glad to let the Babbler go and to seek refuge herself in a neighbouring bush, while 'the seven sisters,' justifiably elated at the success of their attempt, flew to a mango tree and poured forth volumes of abuse against their vanquished enemy. Unless the owner of the Hawk is at hand, Babblers will almost always join in an attack of this kind and give the bird a real bad time.

On one occasion the owner of the Shikra mentioned above actually caught a Babbler which had perched on the back of his Hawk, who was holding another Babbler in her claws, the bird which had come to the rescue having got so firm a grip of the Shikra that it was with the greatest difficulty removed.

Small birds often join to attack or to mob Birds-of-Prey and drive them from the neighbourhood, and Owls especially are persecuted by harassing bands, almost every species in the neighbourhood collecting together to add their quota to the general abuse, till the poor Owl becomes too much confused even to attempt to escape, but sits and blinks in silence, the picture of abject misery. In the *Auk* (April, 1890) Mr. Frank Bolles describes how he turned to his advantage the Owls' unpopularity amongst small birds of all kinds, when he wished to attract and observe them. The experiments were made in the neighbourhood of Cambridge (Mass.) with a Barred Owl, one of a captive pair which he had named 'Puffy' and 'Fluffy.' He says: "With the coming of the warm weather and the return of the birds in the spring . . . I began a series of experiments with Puffy which proved of considerable interest. . . . Taking

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him in a basket to some woods . . . I displayed him to the Robins, Pigeon Woodpeckers, Vireos, and Warblers which chanced to be at hand. No impresario ever was more delighted at the success of a new star. A full house gathered at once. Armed with a field-glass I had the satisfaction of studying at short range the whole bird population of the neighbourhood. The Robins, Brown Thrushes, and Pigeon Woodpeckers were the noisiest, the Oven-birds and Red-eyed Vireos the most persistent, the Chickadees the most indignant. The Woodpeckers went so far as to fly past the Owl so close as to brush his feathers and make him jump at each charge. . . . Whenever on my summer walks I came to a spot which I wished to 'sample' for its birds, I would place Puffy on a bending sapling, and hiding in the neighbouring foliage, I would 'squeak' by drawing in my breath over the back of my hand, and attract the attention of any birds which were near by. An alarm was almost sure to be given that would bring birds from all directions eager to see the cause of disturbance.

"Late one afternoon in August I placed Puffy in the midst of a white birch grove near a brook. A Cuckoo opened the opera and brought some Vireos, including two Solitaries. Their explosions were audible a long way, and for a moment or two the air seemed full of birds, nearly all Warblers, and all coming towards the Owl. I could not count them; they came by scores and swarmed about incessantly like bees. . . . I never expect to see more Warblers in one noisy bunch. As a rule, however, a glance or two seemed to satisfy them, and they went off after their suppers. . . .

"The Bluebirds seemed grieved to think anything so wicked could exist. They perched near him and seemed to be trying with their sweet tones to induce him to give up being an Owl. . . . Winter Wrens told Puffy plainly that he was a thief. . . . Once or twice Humming-birds have buzzed a moment near Puffy's head, as if adding their small tribute of hatred to the general estimate of his character."

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An incident which was witnessed in the States by Mrs. Merriam and a friend seems to show that there may be amongst birds an occasional philanthropist whose hobby is not always appreciated by those upon whom he bestows his well-meant help. In some woods these ladies came upon a Chestnut-sided Warbler hunting over the bushes. He was traced to a nest which contained young, which were being fed by a Redstart, and he took his turn at feeding the babies. The nest, which was in the crutch of a small beech, appeared to be a compact typical Redstart nest, and did not at all suggest the structure made by a Chestnut-sided Warbler. With the aid of glasses the birds were observed for several hours at intervals during the day, and all the while the same singular performance was carried on. The Warbler was very assiduous in bringing food, much to the annoyance of the Redstart, who appeared not to desire his kind offices at all, and did all she could to drive him away. But he was not to be discouraged; like some other philanthropists, he insisted on giving help however little it might be wished for or needed. When the Redstart saw him coming with food she dashed at him before he was anywhere near the tree, her tail wide-spread and annoyance expressed in every feather. But nothing could disturb his meekness or discourage his interference. He waited until she had finished her angry protests, and as soon as her back was turned he slipped up to the nest and gave food to the babies. The indignant mother would hurry back and pounce upon him with such vigour that she came near to tumbling her youngsters out of their nursery: she was excited, he the image of composure, not at all resentful at the snapping of her bill except occasionally when they had a little tussle together.

The next morning one of the young had flown and the other had just left the nest. The Warbler seemed to lose track of it when it flew to another branch, and tried to follow the Redstart, but was at last effectually driven away and the two strangely assorted birds were not seen in company again. Two

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or three weeks later, near the same spot, a Chestnut-sided Warbler was seen by the same observers feeding a grey fledgling of some much larger species. The big baby followed the little Warbler about from tree to tree chirping peremptorily as if he had every right to demand service from his hard-worked attendant, who had to dash about not only for flies, but to keep pace with the active youngster. Could it be the same kind-hearted, interfering bird who had devoted himself earlier in the month to feeding the young Redstart family? If so he would appear to have been a professed philanthropist whose aim in life was to work for other birds' children, even when the parents were themselves quite capable of looking after them. In any case the incidents must be regarded as very interesting and very remarkable.

In speaking of Rooks we mentioned that when a flock is feeding, a sentinel is often posted on a neighbouring tree (or on a boulder, or the top of a knoll, according to the nature of the feeding-ground), where he keeps guard while his companions are foraging. Swans, Geese, Flamingoes, Cranes, some Parrots, and often Grouse, take the same precaution.

The smaller kinds of birds, which associate in flocks, never, so far as I am aware, have sentinels. Tits, Missel-Thrushes, Wheatears, Larks, Pipits, and many others, seem all to be constantly alert, and the moment any one of the birds espies an enemy he gives the alarm, and the whole flock seeks safety in flight. Such birds as Tits join into bands on the approach of winter, when they have no ties to keep them in one place. They then go a-gipsying in flocks, and the advantage which they gain from this is clear. In winter-time the food of such birds is often scarce and difficult to find, and if individual birds were to go hunting for it in solitude it is quite possible that their search would be a long one, often too long for their well-being. But when a large flock of birds all join in the search, as soon as any one of them finds food he announces the fact to his companions by the altered tone of his chirping, with

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the result that the treasure is shared among many. In this way there is of course less danger of any single bird going dinnerless, though some of them may not have such a rich feast as would, if they were lucky, fall to their share as solitary hunters.

Social nesting colonies are formed by many other birds besides those to which we have already referred, and I think none are more striking than those of the different kinds of Weaver-bird. These little birds, most of which are Finches, make wonderful purse- or bag-like nests which are hung from slender branches of trees, often those which overhang the water. The nests are closely and cleverly woven of grass, and many of them have a long tube, like the leg of a stocking, hanging from them, through which the entrance to the nest proper is approached. The peculiar form of these nests no doubt makes it difficult for snakes to obtain access to them, and snakes are amongst a bird's greatest enemies in the warm countries, such as Africa and elsewhere, where they make their home. Other enemies against which they have to guard are monkeys, and the situation of the nests over the water, dependent from the very slenderest boughs, no doubt protects them to a certain extent from these animals. Whether a monkey would be further discouraged by the fact that in order to reach a nest he would have to venture into the midst of a company of hundreds of birds is doubtful, though it certainly seems possible. Often a tree may be seen with as many as a hundred nests hanging from it, like some curious form of fruit, and a strange and lively scene such a tree presents with all the birds flitting briskly backward and forward.

Curious as many of the Weaver-birds' nests certainly are, none are so wonderful as the very remarkable edifice which is constructed by the kind whose habits have earned for it the name of Sociable Grosbeak (*Philetærus socius*), whose home is in South Africa, north of the Orange River. These strange dwellings were, I believe, first described by Lieutenant Paterson

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in his account of *A Journey in South Africa*, in the year 1779.

He says: "I have had frequent occasion to mention the Mimosa . . . a vegetable production which . . . produces in considerable quantities a clear transparent gum . . . esteemed by the natives as a peculiarly delicate species of food . . . and the boughs afford an asylum to a species of gregarious Bird, which seems guided by instinct in the choice of its habitation, for which the tree is peculiarly adapted. The stem being about thirty feet high before it sends out branches, and covered with a smooth polished bark, the birds are defended against the different species of snakes and other reptiles which surround them, and which would otherwise destroy their eggs; while the extent of the branches allows sufficient room for the increasing colony.

"The method in which these birds usually fabricate their nests is highly curious. . . . There could be no less a number than from eight hundred to a thousand residing under the same roof. I call it a roof, because it perfectly resembles that of a thatched house; and the ridge forms an angle so acute and so smooth, projecting over the entrance of the nest below, that it is impossible for any reptile to approach them.

"Their industry seems almost equal to that of the bee; throughout the day they appear to be busily employed in carrying a fine species of grass, which is the principal material they employ for the purpose of erecting this extraordinary work, as well as for additions and repairs. . . . Many trees . . . I have seen borne down with the weight, and others I have observed with their boughs completely covered over; when the tree, which is the support of this aerial city, is obliged to give way to the increase of weight, it is obvious that they are no longer protected, and are under the necessity of rebuilding in other trees.

"One of these deserted nests I had the curiosity to break down, so as to inform myself of the internal structure of it,

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and found it equally ingenious with that of the external. There are many entrances, each of which forms a regular street, with nests on both sides, at about two inches distance from each other."

The first part of this surprising account is true enough, and has been verified many times by later travellers, but we shall see that the last sentence is merely a romantic embellishment. The Sociable Grosbeaks are unpretentious little birds, not unlike common Sparrows, but there is nothing unpretentious about their great block of dwellings, which is three feet high and almost twice as much in diameter; seen in the distance, one of these immense structures may easily be mistaken for a native hut. Under the great roof a hundred or more nests are joined together, side by side; indeed, in one colony as many as three hundred and twenty different nests were counted. The social instinct which leads birds to construct such a marvellous building must be regarded as very remarkable, for considerable powers of co-operation are called into play.

The way in which the nest is made is as follows. Having chosen a suitable tree, all the birds in the community begin to collect material for the roof, which is laboriously built on the support of one or more convenient branches, and it is not until this general covering of thatch has been completed that the many pairs of birds begin to form their own nests. These, like the roof, are made of grass, and are attached side by side to the under surface of the roof. By the time they are all finished the lower side of the structure no longer forms one great hollow, but presents an even surface perforated by a multitude of small circular openings, each of which is the entrance to the private apartment of one pair of birds. The birds are said never to use the same apartment in the great nest for two years in succession, though they remain many years under the same roof; with the return of spring each pair builds a new chamber below the old one, so that the old nest merely becomes a part of the general cover-



THE DWELLINGS OF THE SOCIABLE GROSBEAKS

Hundreds of the little birds combine to build these immense structures. Many families live under one roof, which has often been mistaken, when seen in the distance, for a native hut.

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ing or thatch. So year by year the mass grows larger and heavier, until at last the tree on which it rests may, as described by Lieutenant Paterson, be borne down by the weight of it.

It might be supposed that the great slanting roof, together with the position of the entrances to the nests, all pointing downwards, would afford ample protection not merely from rain (which it does very effectively), but from the attacks of any kind of animal; that, however, is not always the case, for even these nests are liable to be invaded by the larger kinds of snakes. Holub tells us that he himself killed a great snake just as it had gained admission to one of them. It had already killed and thrown out several birds, and was just beginning to enjoy the eggs and fledglings when Holub caught sight of its tail and put an end to its depredations.

One would think that sociability in nesting could be carried no further than it is by these little birds which all make their home under the same roof, but there are in the Antilles and the opposite continent some curious birds often known as Savana Blackbirds, but which naturalists call Anis (*Crotophaga ani*), which associate not only under the same roof, but actually in the same chamber. The Ani, in common with Ostriches, Hornbills, and various Parrots, has eyelashes, a feature which is in itself a rare mark of distinction among birds. It has black plumage, and in some of the British colonies its moral character is supposed to be in harmony with the colour of its coat, for under the title of the 'Black Witch' the bird is accused of all kinds of dreadful malpractices—though as a matter of fact it is quite innocent of the misdeeds attributed to it. When perched on trees the Anis sit close together in rows, and being good-natured, sociable birds they are rarely seen alone. In Jamaica they may constantly be observed in little flocks wherever cattle are pastured, and they render a similar service of freeing the animals from parasites to that which we have already described in the case of various other birds. Meanwhile they invariably post one or more

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sentinels on a neighbouring tree to keep guard and to give warning with their curious cry, which is strangely like the wailing of a robust kitten, should any danger occur.

The chief interest of these birds lies, however, in their nesting habits. Many individuals co-operate in building in a tree a large nest of twigs, covered with leaves; as a wasps' nest is often found in the same tree the dwelling is usually difficult to approach. As soon as the building is finished the hen-birds lay their eggs pell-mell, all together; each egg is about the size of a Pigeon's and is coated over with a chalky film, which at first completely hides the blue shell. Sometimes as many as twenty-one eggs are found in a single nest, arranged in layers with a few leaves between them. Of course a single bird cannot incubate such a large sitting, so this important duty is carried on in a sociable manner by several hens brooding together, side by side. When the young are hatched the friendly parents all assist in feeding them, and it is clearly impossible for any bird under such conditions to have any means of distinguishing its own offspring. The youngsters leave the nest long before they are ready to fly and hop about amongst the branches with their parents, the whole great family forming a very happy party.

CHAPTER XVII

STRANGE COMPANIONS

Friendly relations between animals of different species—Probable advantages—Rhinoceros and Rhinoceros-bird—Ox-peckers, Cattle-Herons, and their English representatives—The Kea Parrot : a digression—Crocodile and Crocodile-bird—Burrowing Owls and their associates—A ‘happy family?’—Fox and Duck : a doubtful case—Eagles and Sparrows—Legionary guards of ants and wasps—Honey-guides and their accomplices.

VERY many birds—perhaps indeed the majority of them—are sociable creatures. We have already seen that they frequently gather in flocks when hunting for their food, or join in warlike bands to attack an enemy; or again, that they form little colonies—townships we might almost call them—for the purpose of bringing up their young. It seems to be not always merely for direct and material advantage that they seek company (though there is usually some benefit to be derived from the companionship), nor is it invariably with their own kind that they associate. It is well known that Thrushes and Robins form strong attachments for those who are kind to them, and seem almost as capable of being pleased by praise or depressed by blame as a pet dog. Parrots, again, which in their wild state are always very sociable in their habits, seem to be perfectly contented in captivity if only they have sufficient attention; they are not happy when left alone, but like to be talked to and made much of. The capacity for enjoying the companionship of other animals is not confined to the most highly developed birds such as Parrots, or indeed to birds at all. Mr. Schillings, the great explorer and naturalist, and the author of several interesting books about the animals of

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Africa, noticed during his travels two elephants which were constantly in the company of an old male giraffe. Day after day the three friends were seen together, and it is possible that they all benefited by the association in this way: the elephant has a very keen sense of smell, but his hearing is not nearly so acute as that of the giraffe; the giraffe has the advantage, owing to his very long neck, of a considerably wider look-out than the elephant; by joining forces, therefore, the animals could render one another the service of mutual protection, the giraffe contributing the eyes and ears to the partnership and the elephant the sensitive nose, and an enemy of any kind whatever attempting to get near the three friends would probably have found himself frustrated owing to the alertness of one or other of the party.

In the same way Ostriches, zebras, and gnus, or Ostriches and antelopes, are often found in company, and there is the greatest companionship between hyenas and jackals; sometimes jackals appear at their ease in the company of a lion, but such a friendship is dangerous, for if game happens to be scarce the jackal is quite likely to provide a supper for the lion in a way that is not contemplated in his particular title of 'the lion's provider.'

All these animal friendships are very interesting, but a far more curious companionship is that between the rhinoceros and his feathered satellite, the Rhinoceros-bird (*Buphaga erythrorhyncha*). The Rhinoceros-bird is a little fellow about the size of our English Blackbird, with a greyish-brown back, a yellowish waistcoat, golden eyelids, and a light red beak. It is found over almost the whole of Central Africa and as far south as Natal, and is usually seen in little flocks of six to eight birds following about the country some of the larger kinds of animals—often, as its name suggests, the rhinoceros, but not infrequently elephants or herds of cattle, or even giraffes. The birds may constantly be seen perching on the back of one of their strange comrades, who appears not to pay the slightest

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attention to them. As a matter of fact, he is no doubt very pleased to receive such visitors, on account of the good services they render him, for, from his point of view, it is their business to deliver him from the discomfort occasioned by bots or tics, which he would find it extremely difficult or perhaps impossible to get rid of were it not for the assistance of his little friends. They for their part, of course, look upon their big companion as a happy hunting-ground for food, so both parties benefit by the friendship and are satisfied.

But as hunters are well aware, there is another service which Rhinoceros-birds render their host, and that is to give him warning of any impending danger; they are always alert and watchful, and the slightest alarm is followed by such an outburst of twittering and such a fluttering of wings that the animal is at once put on his guard and springs to attention, ready either to meet attack or to take flight. Even in this, however, the service is not entirely one-sided, for, as is now well known, the sense of smell is very poorly developed in most birds; even Vultures, which were formerly thought to be able to scent their prey from afar, are quite unable to find the carrion, if it is hidden from sight, though not more than a few feet away from them. The rhinoceros, on the other hand, like the elephant, has this sense developed in a remarkable degree, so that it is sometimes he who gives notice to the birds of the approach of danger.

There are many birds besides the Rhinoceros-bird which are found associating with animals of various kinds. There is, for instance, its South African relative, the Ox-pecker (*Buphaga africana*). It is very interesting to watch a party of these birds moving about the body of an ox or a horse, creeping over him in all directions and assuming the most unexpected attitudes while they search in a business-like way for food. In the southern part of the continent this is quite a familiar sight; no sooner is a team of oxen outspanned than a party of Ox-peckers arrive on the scene and perch on some neighbouring tree to watch until it is time for them to commence their

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operations. They never seem to intrude until the animals have all been watered and have settled down to steady grazing; then, one after another, they leave their tree-top and, after circling in the air two or three times to reconnoitre, make choice of an animal and settle down in a row upon his backbone. For a minute or two they remain quiet as if to make quite sure they are not likely to be disturbed during their meal; then they set to work. There is no doubt that their attentions are very much appreciated by the ox, which may often be seen stretching himself out as if to give them every facility for thorough exploration. Having obtained all the food they can from one animal they transfer their ministrations to another, and so on until their appetite is satisfied.

We cannot attempt to mention all or nearly all of the birds which constitute themselves regular attendants upon cattle. In America there are several, such, for example, as the homely but much esteemed Phœbe, which hunts the flies which torment them. In Madagascar it is a species of Heron which renders this service to the animals, and the birds are highly valued by the Malagasy, who, being themselves far too lazy to perform kind offices for their cattle, would regard it almost as sacrilege to destroy their feathered servants; consequently Herons are very numerous in the island, and five hundred or more may occasionally be seen roosting in the trees together. In the morning the sleeping party breaks up and the birds distribute themselves amongst the cattle. In Lower Egypt and elsewhere in Africa, the little Cattle-Heron (*Bubulcus ibis*) is constantly seen in the company of oxen and buffaloes; and as many as twenty birds often become the self-appointed body-servants of an elephant. Here again the birds live on most excellent terms with the natives and carry on their work quite regardless of their presence, often frequenting villages or encampments.

It is not necessary, however, to go abroad to find examples of this kind of companionship between birds and cattle. In England Starlings may often be seen hunting in little flocks

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around grazing animals and running over their backs one after another, much as the Ox-peckers do in South Africa. I have also seen sheep standing quite still, enjoying the attentions of Rooks perched upon their backs.

It is possible, however, that the birds are not always as friendly as they might at first appear to be, for on a certain day in early spring, when birds were busy with their nests, my mother observed a party of Crows or Rooks perched upon a thick-coated donkey, three on its neck and two on its back, assiduously engaged in tearing out bunches of hair with their powerful bills, while the donkey patiently submitted to their outrageous treatment.

This incident recalls the still less pleasant relations which have sprung up between the Kea Parrots and sheep in New Zealand. Parrots, like Birds-of-Prey, have strong hooked beaks, which in both cases are used for tearing the food into small pieces, though the diet of Birds-of-Prey consists of flesh, while Parrots are vegetarians. Since sheep-farming became prevalent in the colony the Kea Parrots have developed a taste for mutton, greatly to the annoyance of the farmers, and their proceedings are peculiarly objectionable. Parties of the birds worry a sheep until it is exhausted, and then settle upon its back and dig down with their beaks until they reach the fat around the kidneys, on which they feast, with a fatal result to the victim. How they learnt this bad habit nobody knows; several explanations have been suggested, but as none of them is very satisfactory we need not enter into them here.

A far stranger case of friendship than any to which we have hitherto referred is that between the crocodile and the Crocodile-bird, which attracted the attention of Herodotus more than two thousand years ago. This is what the old historian wrote on the subject: "As the crocodile lives chiefly in the river he has the inside of his mouth constantly covered with leeches; hence it happens that while all other birds and beasts avoid him he is at peace with the Trochilos since he

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receives good from that bird. For the crocodile, when he leaves the water and gets upon the land, lies with his mouth wide open facing the western breeze; at such times the Trochilos enters his mouth and devours the leeches. This is good for the crocodile, who is pleased and takes care not to hurt the Trochilos." This queer story of an *entente cordiale* between such ill-assorted neighbours was repeated by many later writers for centuries afterwards. The old seventeenth-century chronicler Purchas, for instance, gives us in *Purchas his Pilgrimes* the following quaint version of the tale as it appeared in the book on Africa published about half a century before by Giovanni Leone (or John Leo as we might perhaps call him in English), the traveller and geographer:—

"As we sayled further, we saw great numbers of crocodiles upon the bankes of the islands in the midst of Nilus, lye basking them in the sunne, with their jawes wide open, whereunto certaine little birds about the bignesse of a thrush entering, came flying forth againe presently after. The occasion whereof was told me to be this: The crocodile by reason of their continual devouring beasts and fishes, have certaine pieces of flesh sticking fast between their forked teeth, which flesh being putrified, breedeth a kind of worme wherewith they are cruelly tormented, wherefor the said birds, flying about and seeing the wormes, enter into the crocodile's jawes to satisfy their hunger thereon, but the crocodile, perceiving himself freed from the wormes of his teeth, offereth to shut his mouth, and to devour the little bird that did him so good a turn, but being hindered from his ungrateful attempt by a prickle which groweth on the bird's head, he is constrained to open his jaws and to let her depart."

Giovanni was evidently not a very firm believer in the crocodile's friendship, but he was mistaken in saying that his evil intentions are frustrated by a prickle which grows on the bird's head. What Giovanni mistook for a prickle is nothing more than a graceful crest of slender feathers, which might

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tickle the crocodile's throat, but would certainly not hurt him. That, however, is the old legend, and we find it repeated again with slight variations in the eighteenth century. In the nineteenth century the same tale was told by the Nile boatmen to travellers and tourists; but in these critical days such a wonderful story was not likely to pass unchallenged, and it came to be regarded with mild amusement and a considerable amount of doubt, to say the least of it. Two birds were pointed out to tourists as being the very "Trochilos" of Herodotus: two species of Plover, both of them beautiful and graceful birds which may often be seen haunting the sand-banks of the Nile.

One of these birds is the Spur-winged Plover (*Charadrius spinosus*), which is not unlike our own beautiful Lapwing either in general appearance or habits. The peculiarity of this bird, however, is that on each wing it has a spur which is sometimes very long and sharp but occasionally a mere knob, and the Egyptians have a much more plausible story than that of Giovanni Leone to tell concerning the bird, which, from its note, they call the Zic-zac.

According to Dr. Adams, they say that the crocodile sometimes falls asleep while his leech-catcher is at work, and forgets to keep his mouth open. "On such occasions the Zic-zac applies his spurs to the interior of the Crocodile's mouth, by way of refreshing the memory of the latter that his faithful henchman is within, when the monster's jaws open immediately, as if his reptilian majesty was sorry for his obliviousness. This addition to the old story was given me on good authority as being very generally believed among the Nile boatmen."

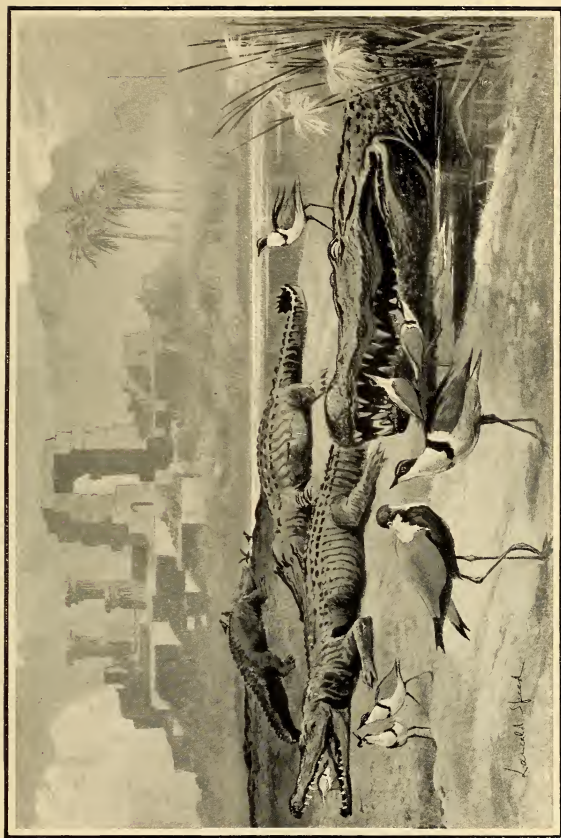
The other bird which disputes with the Spur-wing the honour of being associated with the ancient family of crocodiles is the Black-headed Plover (*Pluvianus ægyptius*). A few years ago, however, both the Black-headed Plover and the Spur-wing seemed likely to lose their reputation; but at that time Mr. John M. Cook, of tourist fame, wrote a letter to the *Ibis*, in which he emphatically confirmed the old story and

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stated that he had but recently learnt that it was seriously doubted.

In his letter, he says that when he was travelling on the Nile in March, 1876, with several members of his family, they noticed some large crocodiles accompanied by Crocodile-birds on an extensive sand-bank between the First and Second Cataract.

He and his brother-in-law decided to watch them. That, however, is by no means an easy matter, for it happens that as in the other cases of friendship between bird and animal which we have already mentioned, the bird in this instance also is an indefatigable sentinel, and is thoroughly detested by all sportsmen who meet with it. Many a gunner who has spent hours in attempting to out-manœuvre a flock of Geese has been frustrated at last by a prattling Zic-zac standing on a sand-bank jerking his head up and down or wheeling about overhead and shrieking out his warning to every living creature for half a mile around. Mr. Cook, therefore, had to resort to strategy in order to be able to observe the birds and crocodiles at close quarters, so during the night he had a pit dug in the sand-bank, in which he and his brother-in-law concealed themselves at daybreak. Nothing interesting occurred until noon, when two large crocodiles came out of the water and settled down for their midday sun-bath, and very soon afterwards several Spur-wings began to flit about them. Through their field-glasses the watchers were able to observe quite clearly everything that took place, and what they saw was this. One of the birds deliberately approached a crocodile who was apparently fast asleep, but who at once opened his jaws to welcome his visitor. The invitation was accepted; in hopped the bird and down closed the huge mouth: in a minute or so the beast opened its jaws again, and the bird, apparently none the worse for its temporary imprisonment, went down to the water's edge. It was too far away for Mr. Cook to see exactly what it did there, but after a few seconds it returned to



CROCODILE-BIRDS

A friendly agreement appears to exist between the birds and the crocodiles. As those formidable animals lie upon the sandbanks of the Nile, the birds pick leeches and fragments of food from their mouths, sometimes boldly venturing inside for that purpose. Two different species are said to render this service to the crocodile, and both are shown in the illustration, the bird on the right in the foreground being the black-headed plover, that on the left the Egyptian spur-winged plover.

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the crocodile and the incident was repeated. The same thing happened a third time, so that there could be no doubt as to the bird entering the crocodile's mouth.

The story is so circumstantial and so clear that we cannot, I think, deny to the Spur-wing the right to be recognised as a true Crocodile-bird. It seems quite likely, however, that the Black-headed Plover lives on equally intimate terms with these huge reptiles; and Brehm tells us that he himself has repeatedly seen that bird picking the crocodile's teeth, exactly as the ancients stated that it was in the habit of doing.

Extraordinary and unlikely as it may seem, then, that any friendly feelings can exist between such a hideous and ravenous creature as the crocodile and these extremely dainty and attractive birds, I think we must admit that there is a working agreement between them, and that even the crocodile can realise that it would not be to his advantage to hurt the little neighbour who looks after him so carefully. This is the more remarkable as crocodiles are, as a rule, quite ready to profit by any opportunity of making a meal of a disabled bird. Even a full-grown Vulture, feathers, claws, beak, and all—as unattractive a mouthful as one could imagine—has been discovered intact in a crocodile's stomach.

The most famous of all the associations which exist between birds and animals is undoubtedly that of the prairie-marmots of North America and the little Burrowing Owls. The prairie-marmots, or prairie-dogs as they are often called, are queer little animals which form large colonies known as 'dog-towns,' consisting of a great number of burrows with a mound of earth at the mouth of each, on which the owner sits and surveys the surrounding country, or amuses himself with a kind of cheerful yelping conversation with his neighbours. The Owls are quite small birds, not nearly so large as the smallest of our English Owls, and they may often be seen sitting in couples very close together and looking very Darby-and-Joan-like, somewhere about the mound, in company with the prairie-

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marmot. When alarmed they all scuttle into the burrow as fast as they can. But besides the Owls and the marmots there is often yet another inhabitant of the burrow, and that is a rattlesnake. A good deal of nonsense has been written about the pleasant relations which exist between these apparently ill-assorted companions. According to the accounts which were repeated in all the natural history books for many years, one would imagine that they form a kind of Barnum's 'happy family' whose harmonious and confidential relations are typical of all that is most pleasant in a Utopian dream; but this beautiful fairy-tale has unfortunately been found to have not very much foundation in fact. Dr. Coues satirises these stories in a very amusing fashion: "According to the dense bathos of such nursery tales, in this underground Elysium the snakes give their rattles to the puppies to play with, the old dogs cuddle the Owlets, and farm out their own litters to the grave and careful birds; when an Owl and a dog come home, paw-in-wing, they are often mistaken by their respective progeny." It is a beautiful story and it seems almost a pity to spoil it, but there are things as strange and wonderful in the real lives of animals as any that have been imagined by stay-at-home naturalists, so we will try to do without such pretty fictions and to see what really goes on in these mysterious underground dwellings, the homes of the prairie-marmots.

If we could enter at the little round hole which is the front door of the marmot's habitation, we should find that it leads into a long and complicated burrow which is connected with other similar burrows in a kind of labyrinth, like the winding streets of an old city. Some of the burrows end in little chambers or living-rooms, and when the owners are not busy eating or gossiping with their neighbours they spend a good deal of time repairing or extending their dwellings. As in other towns, some of the dwellings are unoccupied, and these offer a convenient home for the little Owls, who are quite able to dig for themselves, but are by no means so expert in excavat-

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ing as the marmots, so that they not unnaturally are glad to take advantage of the labour of those little animals. It is true that the Owls and marmots have often been seen scuttling into the same hole, but that does not prove that they live in the same room, for in their anxiety to take refuge underground when disturbed they might very well disregard for a moment the real owner's claim to privacy ; and it is of course often quite possible for two distinct dwelling-chambers to be approached from the same vestibule.

As to the rattlesnakes, they are as venomous and dangerous in the dog-towns as anywhere else ; as acquaintances they are undesirable ; as visitors it may safely be assumed that they are after no good. They are fond of wriggling into holes, and the burrows are there like great free hotels where they can secure with the least amount of trouble both board and lodging, for within they find an appetising supply of puppies, Owlets, and eggs, of all of which they are very fond. In their turn the Owls no doubt enjoy a succulent young puppy, and may occasionally take their revenge by dining off the rattlesnake. The poor prairie-marmot is the chief sufferer, for he is imposed upon by both parties and gets nothing in return, except an unsought notoriety in natural history books. But like Mark Tapley, the little animals are always cheerful, always "jolly" however unpleasant the circumstances may be ; they accept the situation philosophically and live on familiar, if not altogether cordial, terms with their unbidden guests.

In South America, where there are no prairie-marmots, the Owls quarter themselves upon the vizcachas, which are gnawing-animals about the size of rabbits and are closely related to the chinchillas, from which the beautiful soft chinchilla fur of commerce is obtained. The vizcachas do not form great towns consisting of hundreds of little mounds scattered over the plain like those of the prairie-dogs, but fifteen or twenty individuals establish on the pampas a sort of residential club, which the natives call a vizcacheria. A vizcacheria is a large mound or

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hump formed by the earth which is thrown out of the ground when the animals are making their burrows, the openings of which may be seen around the mound. It is kept very clean and very tidy, every scrap of vegetation being carefully removed; and the ground round about is smooth like a lawn, because the vizcachas bite off the grass very closely. In this way there is no doubt they greatly improve the quality of the turf, just as sheep do, and so have been of benefit to the farmers; but in spite of that they are not regarded with a friendly eye, because not only does the vizcacheria occupy a great deal of land—that perhaps would not be of very great importance on these wide plains—but its inhabitants eat a large amount of fodder. They are therefore persecuted and discouraged as much as possible, but it is no easy matter to get rid of them, because the task of digging out such a complicated warren is an almost impossible one.

A very remarkable and very interesting fact concerning the vizcachas may as well be mentioned here. We have already seen that certain birds, especially the Bower-birds of Australia and New Guinea, collect all sorts of queer objects such as bleached bones, pebbles, shells, or almost anything that is hard and portable, and heap them up beside their bower, where they seem to be intended partly for decoration and partly for use as playthings. The vizcacha is, so far as I know, the only animal with a similar habit. On the top of the vizcacheria are found piled together with the *débris* of the inhabitants' food (consisting of thistle-stalks, maize-cobs, and the like) all kinds of objects which they have come across in their wanderings: bones of cattle and of the South American Ostriches are there, stones and clods of earth, and anything else which is to be picked up on the pampas. Moreover, just as in the case of the Bower-birds, if a passer-by happen to lose any of his smaller belongings, such as a watch or a knife, the vizcachas are pretty sure to add it to their collection, and the best way to set about recovering lost property is first of all to call and make inquiries at all the vizcacheries in the

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neighbourhood. Such then is the companion of the Burrowing Owls in South America, and no doubt the relations between the two are not more or less cordial than in the case of their representatives in the northern continent. But as the vizcacha is a somewhat larger animal than the prairie-marmot, it is possible that he is better able to look after his interests and see that he is not imposed upon by his lodgers.

There is one peculiarity about these little Owls which we have not yet mentioned. As they sit sedately on the summit of a mound, looking very comical and top-heavy on their long shanks, they have a habit of twisting their head round so as to keep the passer-by constantly in sight without making any movement of their body, and should he move round them in a circle it almost seems as if they were in danger of screwing their heads right off. Often they greet the visitor with a series of little bows and indulge in curious antics, of which Captain Bendire gives a most amusing account. He says: "The element of the grotesque is never wanting; it is hard to say whether they look most ludicrous as they stand stiffly erect and motionless, or when they suddenly turn tail and duck into the hole, or when engaged in their various antics. Bolt upright, on what may be imagined their rostrum, they gaze about with a bland and self-satisfied, but earnest air, as if about to address an audience upon a subject of great pith and moment. They suddenly bow low, with profound gravity, and rising as abruptly, they begin to twitch their face and roll their eyes about in the most mysterious manner, gesticulating wildly, every now and then bending forward till the breast almost touches the ground, to propound the argument with more telling effect. Then they face about to address the rear, that all may alike feel the force of their logic; they draw themselves up to their fullest height, outwardly calm and self-contained, pausing in the discourse to note its effect upon the audience, and collect their wits for the next rhetorical flourish."

The rest of their time out-of-doors is spent in hunting for

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insects and the small rodents which form their food, hovering suspended in the air like a Hawk and then darting down noiselessly and swiftly and seizing their prey without arresting their flight for a moment. In twenty-four hours a pair of these Owls will eat considerably more than their own weight of food, and as most of it consists of noxious vermin there is no doubt that they are immensely beneficial.

Their love-note is a mellow, far-reaching "coo-c-o-o" long drawn out, not unlike the cry of a Cuckoo, but less staccato. Sitting on his hillock, the male bird sometimes keeps up his serenade for an hour or more.

A fable which had its origin among the Indians states that at the approach of winter the Owls retire into the burrows and hibernate; but in most localities they may be seen abroad all the year round, and where they disappear from their summer quarters on the approach of cold weather it is doubtless owing to their migrating to a more congenial climate.

It remains to be said that no birds carry more rubbish into their homes than these, and that even Vultures are not much more unclean. There is certainly nothing romantic about their underground living-room. Little scraps of dead animals, bits of skin, the remains of a snake, perhaps, and invariably countless fleas, make the burrow as insanitary a dwelling as any that is occupied by a bird.

Sometimes the birds occupy the underground dens of badgers or foxes, but it is hardly likely that they share them with those animals, although, if we may rely on the accuracy of a story related by Brehm, it is not altogether unknown that the fox and the badger should tolerate the society of a bird. In this case the bird concerned was the handsome Sheld-duck or Burrow-duck (*Tadorna cornuta*), which is found all the year round on suitable parts of our coast and on those of other countries bordering on the North Sea, preferring the neighbourhood of mud-flats or low sand-hills, where its food is most

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plentiful. It is a fine bird about two feet long, with a dark glossy green head and neck and a broad white collar, the remainder of the plumage being black, white, and rich chestnut. Specimens may now often be seen on the ornamental waters in our parks, and they are easily recognised by their bold, striking appearance.

Brehm's story is as follows. Towards the end of May, while a forester was busily employed in a wood near the coast, he observed a pair of Sheld-duck flying several times around himself and his men and at last settling on a hillock of sand; there the Drake remained to keep watch while the Duck disappeared into a burrow in the hillock. In about a quarter of an hour the latter came out again, and after exchanging polite greetings the pair of them flew away and alighted on several different spots one after another, as though for the purpose of misleading the person who was watching them. On going to the mound where they had first settled the forester found there the earth of a fox, at the entrance to which there were numerous recent footmarks of both fox and Sheld-duck. He kept the birds under observation for several days, and he discovered that this was not their actual abode, but that they had settled down in the much larger earth of a badger, which appeared to be frequented by a fox as well as by the real proprietor. He found that the badger was in the habit of going about his business without concerning himself in the least with his housemates, whose mingled footprints could be traced far into the burrow. There were other holes connected with the same den, through which the fox was in the habit of passing, and in these also the ground was trampled down by the Sheld-duck, between the large imprints of whose feet the impressions of the fox's delicate paws could be clearly seen.

Concealing himself behind a sand-bank, the forester kept watch, and was soon rewarded by seeing the artful birds pay a visit to their sham nesting-place as before, after which, flying close to the ground, they came to their true dwelling and,

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having reconnoitred for a few moments, disappeared into the den, where one of them remained. According to this account, then, a badger, a fox, and a pair of Sheld-duck apparently lived in amity in the same dwelling; and if that be so it is quite conceivable that a Burrowing Owl might do the same, though we are not accustomed to regard the fox as being by any means a clubbable creature, especially in its relations with the feathered kind.

But after all it is not really very much more improbable than the relations which exist between some large and powerful birds of predatory habits and their weaker kindred. Whole colonies of Tree-Sparrows often make their quarters in the huge mass of material of which a Sea-Eagle's nest is composed. The impudent little birds hop about without caring either for the young or the old Eagles, and quite friendly relations seem to exist between the mighty lords of the nests and the little intruders. These Eagles, however, never appear to pay attention to small birds, which they perhaps consider too insignificant for their notice. Turtle-Doves and Thrushes have often been observed quietly sitting on their nesting-trees, and on one occasion a Wild Duck had chosen this very unlikely locality for the purpose of rearing its own family.

Ospreys are equally tolerant and, in places where they are common on the North American coast, Purple Grackles or Crow-Blackbirds often make their homes in the interstices of their bulky nests, as many as eight or ten pairs taking up their quarters under the protection of their powerful neighbour and showing considerable boldness in helping themselves to fragments from his table. They probably owe their immunity from interference to the fact that the Osprey's diet consists entirely of fish.

Perhaps the most curious of all the associations into which birds enter with other animals is seen in the advantage which they take of the protection afforded by a colony of stinging or biting insects. Many of the Orioles in tropical America

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hang their nests from the extreme end of a branch of the prickly bull's-horn thorn, where they are protected not only by the formidable thorns, but by the stinging ants which inhabit them. In the same country, on the plains, a small species of Parrot secures protection by building in a hole made in the nest of a colony of termites, or 'white ants' as they are sometimes called, and the Cassique (*Cassicus persicus*) often chooses for nesting purposes a tree which is also inhabited by these insects. It is possible that the birds sometimes regard their neighbours as suitable material for a meal, but Mr. Bartlett, who watched them for hours, could never discover that they interfered with the insects, while he himself had very great difficulty in obtaining a Cassique's eggs and nest owing to the considerable risk of being severely stung in the attempt. In Australia a Long-tailed Kingfisher (*Tanysiptera sylvia*) burrows into ant-hills for nesting purposes.

Wasps also are often regarded by birds as desirable neighbours, and the same Cassique which shares a tree with white ants often makes its home in the neighbourhood of a large wasps' nest. One of the South American Flycatchers takes similar precautions, and the little Grass-Quit of Jamaica (*Spermophila olivacea*) not only builds in the neighbourhood of a wasps' nest, but plans its own home so that its front door may be quite close to their cells. It is an interesting comment on the character of their body-guard, however, that birds which build in these situations nearly always construct covered nests, probably in order to ensure themselves against possible attacks from their unstable friends.

The part played by hymenopterous insects in the alliance entered into by the Honey-guides, though important, is an unenviable one, for it is to exploit and rob them that the birds seek an accomplice. There are several species of Honey-guide, but that which is best known is the South African species first described by Dr. Sparrman, and called after him *Indicator sparrmani*. It is a small and inconspicuous bird, no larger

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than a Lark ; its colour iron-grey above and white beneath, and its bill very like that of a Sparrow.

Now this little bird is very fond of honeycomb, or of the grubs contained in a bees' nest, or perhaps of both ; but though it has no difficulty in finding the nest, it is not strong enough to break in without assistance. It has discovered, however, that other more powerful animals also have a fondness for honey, and that if they can be induced to follow to the nest their guide stands a chance of getting a share of the spoil. It therefore looks out for an accomplice, and Dr. Sparrman says: "Not only the Dutch and Hottentots, but likewise a species of quadruped named Ratel—[*Mellivora capensis*, an animal closely related to Badgers, whose food consists chiefly of honeycomb, which it easily digs out with its powerful claws]—are frequently conducted to the wild bee hives by this bird, which, as it were, pilots them to the very spot. The honey being its favourite food, its own interest prompts it to be instrumental in robbing the hive, as some scraps are commonly left for its support.

"The morning and evening are its times of feeding, and it is then heard calling in a shrill tone, *cherr, cherr*, which the honey-hunters carefully attend to as the summons to the chase. From time to time they answer with a soft whistle, which the bird hearing always continues its note. As soon as they are in sight of each other, the bird gradually flutters towards the place where the hive is situated, continually repeating its former call of *cherr, cherr*; nay, if it should happen to have gained a considerable way before the men (who may easily be hindered in the pursuit by bushes, rivers, or the like), it returns to them again, and redoubles the note, as if to reproach them with their inactivity. At last the bird is observed to hover for a few moments over a certain spot ; and then silently retiring to a neighbouring bush or resting-place, the hunters are sure of finding the bees' nest in that identical spot, whether it be in a tree or in the crevice of a rock, or (as is most commonly the case) in the earth. Whilst the hunters are busy

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in taking the honey, the bird is seen looking on attentively to what is going forward, and waiting for its share of the spoil. The bee-hunters never fail to leave a small portion for their conductor, but commonly take care not to leave so much as would satisfy his hunger.

“The bird’s appetite being whetted by this parsimony, he is obliged to commit a second treason, by discovering another bees’ nest, in hopes of a better salary. It is further observed that the nearer the bird approaches the hidden hive, the more frequently it repeats its call, and seems the more impatient. I have had frequent opportunities of seeing this bird, and have been witness to the destruction of several republics of bees by means of its treachery. I had, however, but two opportunities of shooting it, which I did to the great indignation of my Hottentots.”

Though a similar story is told by many African travellers, from Bruce to Livingstone, it has several times been discredited. Mr. Layard, for example, says that the birds will not unfrequently lead any one to a leopard or a snake in the same way. It is certain, however, that its noisy cry often has the effect of guiding men to bees’ nests, and that it profits in consequence; so even if it does not instinctively seek an accomplice in its robbery, there is no reason to doubt that, being an intelligent and sociably inclined bird as it certainly is, it learns by experience the advantage of a working partnership.

CHAPTER XVIII

BIRDS ABOUT TOWN

Advantages of town life—Kites in old London—Scavenger birds at work—The last of the London Ravens—Citizens of the Crow family—Adaptability of the Wood-Pigeon—Moorhens and Dabchicks—The ways of the half-tame Wild Duck—Small birds—Occasional visitors—The Woodpecker: a case of circumstantial evidence—Perils of town life—Bird-watching in town—A walk across Kensington Gardens.

EXACTLY when it was that birds began to take up quarters in the neighbourhood of men's dwellings we shall never know, but there can be little doubt that it was quite early in the history of mankind. There is reason to believe that soon after houses with eaves were first constructed birds discovered that they afforded convenient protection, such as could be found in few places elsewhere, for their nests, and confidently sought hospitality there. The Swallow and Martin were no longer obliged to hunt diligently for suitable building-sites in caves or about cliffs and precipitous rocks; the Sparrow found nooks where he could make his nest and have a roof to protect his family from the weather without the necessity of constructing a dome to cover it; and the discovery having once been made, and proved to be of advantage to the race, became a habit, and in time led to an established instinct for association with man.

But it is not unlikely that there were still earlier associations, less close, perhaps, and of a different origin, while man was still a wanderer and had not yet begun to build permanent dwellings or to found villages and towns. Wherever there was a human encampment there would be the refuse of human food

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—rejected portions and unconsidered fragments from meals, enough to provide a feast for many birds; and food is no less necessary to the well-being of the individual and the species than shelter from the weather or from prowling enemies. It is probable, therefore, that the first birds which became the neighbours of man were attracted by the possibility of obtaining a fairly regular supply of food with little trouble, and were, in fact, scavengers and carrion birds, whose visits, being clearly to his advantage, man would not be likely to discourage.

Without going back to any earlier records, let us now take up the story in our own country.

A foreigner who visited London towards the end of the fifteenth century was astonished by the enormous number of Kites which he saw flying round London Bridge. At that time they were as common here as in Cairo and were even protected by law in the City. Things have changed greatly since then, and the bird population of London has altered with the human inhabitants; indeed, the one depends very greatly upon the other.

In the fifteenth century London Bridge was bordered on either side by dwellings, modern drainage was unknown, and such garbage as was not left lying about the streets eventually found its way for the most part into the river. There was therefore plenty of food for the Kites, of the kind in which they delight, and they became the city scavengers just as they are in many places abroad at the present day. They were not altogether satisfied, however, with refuse only, for Dr. Turner, who was Dean of Wells in the middle of the sixteenth century, tells us that in his time the Kites were wont to snatch food out of children's hands in the city streets.

In Calcutta the common Pariah Kite (*Milvus govinda*) is still perhaps the most abundant of all birds, and its vast numbers and fearlessness impress the stranger from England as greatly as the foreigner, in times gone by, was impressed by the multitude of Kites around London Bridge. Every large town

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and cantonment in India, every village, has its colony of Kites which ply their busy calling from earliest dawn until sunset or even later. Every camp has its Kite camp-followers, and even single travellers have their Kite attendants, whose one aim in life is to gather up the fragments of food which are left from meals.

In the great towns the birds seem to be perfectly well aware of the usual time for the rubbish to be put out, for they are all on the look out for it and as soon as a basket of refuse is placed in the street all the Kites in the neighbourhood dash down upon it. Some of them seize the most tempting morsels immediately in their first swoop, others are more fastidious and spend some time in selecting their scraps from the heap. There is many a struggle for the larger fragments, and even when the successful bird has got away with his prize he is not left to enjoy it in peace. Half a dozen pursuers are close behind him; they swoop around him and torment him until he finds the chase too hot and drops his booty, which is pretty sure to be seized by another bird before it reaches the ground. In this way a fragment may change proprietors half a dozen times, to the accompaniment of much unmusical squeaking, before it is eventually eaten.

The birds are remarkably bold and intrusive, and do not hesitate to snatch garbage from under the very noses of the scavenger dogs. But they go further than this, for they will enter the houses and steal morsels from dishes as they are carried from kitchen to hall, and it is stated on very good authority that they will sometimes even seize fragments of food from a man's mouth before he can close his lips!

In cities where they regularly make their home, Kites build untidy nests of sticks, lined with scraps of rag or other rubbish, on houses or any convenient high buildings. In the middle of the day they may often be seen flattened against the entablatures of buildings with their breasts to the wall and wings half spread, exactly as you may see them represented on certain



KITES IN LONDON

In the sixteenth century kites were common in London streets, and used to snatch bread from children's hands. Hundreds of them haunted the neighbourhood of London Bridge, and fed on the garbage which they found floating on the river.

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Egyptian monuments. In this position they have scarcely the appearance of living birds at all, but look rather like some curious form of architectural decoration.

In many of the warmer quarters of the globe the duty of destroying the garbage of cities is left almost entirely to birds. In the Southern States, for instance, as at Charlestown, Turkey-Buzzards, as the Vultures (*Catharistes*) are usually called, have practically had the contract for this work handed over to them, and they may safely be relied on not to neglect their duties. At Charlestown they frequent the very heart of the city, where they sit in rows on the houses adjoining the market and on the market buildings, waiting and watching for scraps. The moment any refuse is thrown into the street the great birds tumble from their perches helter-skelter with much fluttering of wings, and a regular tug-of-war ensues. As soon as the matter is settled they stand awhile as if in contemplation, considering whether there is any further business to detain them, and then stalk away with as much dignity as they are capable of showing. Dignity is not, perhaps, a very marked characteristic of city Vultures, for they seem to be even more lazy and slovenly in their habits than their country cousins on the open plains.

It must be admitted that, however useful they may be, Turkey-Buzzards are by no means attractive birds when on the ground, and even in flight they are less noble than most other species of Vulture, some of which appear extremely graceful when soaring on motionless wings for hours at a time on the look-out for prey.

The table manners of the whole tribe can only be described as repulsive. They eat until they are incapable of swallowing another morsel, and still they eat until the food drops from their ugly beaks. Then they sit in a dejected attitude, too heavy to move, awaiting the happy moment when partial digestion of their gluttonous feast will permit them to eat again. A Vulture who has done all he can to satisfy his

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hunger is absolutely incapable of flight, and if he would escape an enemy he is obliged to disgorge his meal before he is able to raise his overweighted body from the ground.

It is often supposed that because these unattractive birds are ordinarily seen feeding on putrid animal matter they prefer their meat in a state of decay. That, however, is not the case; the reason why they sit round a dead animal waiting until decomposition sets in is that their beaks are too weak to tear the skin until it has become softened by the natural process of decay.

Scavenger birds have long been deprived of their occupation in English cities, and are no longer to be found there, unless we regard as such the Sparrows which pick up their living in the streets, or the Black-headed Gulls which of late years have visited London in greater numbers each winter, adding much to the charm and interest of the bird-life.

The Storks which, as we mention elsewhere, are regular summer visitors to many continental towns, where they are afforded encouragement and protection, are not only useful as scavengers, but are picturesque and pleasant neighbours whom we should gladly welcome. Why they do not come to us it is not easy to explain.

When Kites disappeared from London they were succeeded by Ravens, which were quite common until about the middle of the eighteenth century and still lingered in the outskirts of the city a hundred years ago. A pair of these delightful and interesting birds bred year by year in a large elm in Hyde Park about the beginning of last century, until a keeper robbed them of their young, when they forsook the Park for ever. One of the nestlings which had been reared was again given the freedom of the Park; he became very sociable and haunted the bridge at the top of the Serpentine, occasionally amusing himself with long excursions. One day a lady passing over the bridge dropped a gold bracelet, which the Raven immediately seized and carried away; no doubt he hid it in the hollow

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of one of the great elm trees, where it will perhaps some day be found. This bird was a great favourite with all visitors to the Park, but after a while he was stolen and for some time nothing was heard of him, until he one day reappeared with a cut wing. The indignity seemed seriously to have affected his spirits, for he never recovered his former lively habits. He became dull, unsociable, and mopish, and was found one morning drowned in the Serpentine. The public verdict was that he had committed suicide. Such was the fate of the last of the Park Ravens. Since then a few of these birds have come as temporary visitors to town from time to time, but have never stayed there, and the only Ravens which can now be regarded as confirmed Cockneys are those which are kept at the Tower.

At the present day people seldom see a wild Raven in England at all, for the few that remain with us make their homes on some dreary and rock-bound part of the sea-coast. We are so accustomed to think of them as shy and retiring birds that it is rather difficult to realise that in certain parts of the world they are still as abundant and tame as chickens in a farmyard. On Alaska Island, for example, Mr. Burroughs found Ravens extremely common both in the town and in its surroundings. They were cheery birds and thoroughly sociable in their habits, talking and croaking to each other all the day. Sometimes a bird would sit apart from the others apparently soliloquising and repeating over to himself every sound that he knew.

No bird is more interesting or full of amusing antics than a Raven. He looks wiser than any Owl, because more alert. He is as full of strange antics as a Parrot, and not a whit less talkative after his own fashion. Altogether he is a far more desirable scavenger than the unlovable Vulture. There is something inexpressibly droll about his every movement, his cunning sidelong hops and curious prancing walk. He looks at you in such a knowing fashion with his head turned on one side, and his hoarse croak is capable of expressing such

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varied emotions. One would gladly receive him back as a fellow-citizen. But though many new birds have come to town during the last twenty years, there is, I fear, no possibility of the return of the Raven.

There are, however, two or three birds belonging to the same family which make their homes in London. In some of the large parks there are always a few Carrion-Crows, which may be seen wandering about in couples, looking very sedate and respectable in their glossy black plumage. But respectability is not a characteristic of the Carrion-Crow. You will never see any other bird associating with him ; they all regard him with suspicion and give him a wide berth, and with very good reason, for they are quite well aware that he misses no opportunity of robbing them of their eggs, or young, or food, or anything else which takes his fancy. Carrion-Crows are on this account not greatly encouraged by park keepers, for they undoubtedly take toll of many Ducks' eggs and Ducklings during the season. But they are so picturesque, and so canny in their ways, that I think we should be pleased to entertain them even on these terms.

Civilisation, however, softens even the manners of the Carrion-Crow to a certain extent, for though he is by principle a robber and carnivorous by inclination, there is something of the philosopher in his composition, and he is quite disposed to take things as he finds them, even in the less offensive meaning of the phrase. So the Cockney Crow, like all other Cockney birds, is very largely a bread-eater—so much so, indeed, that some years ago at Clissold Park a Crow was seen flying laboriously along with the upper part of a cottage loaf impaled on his bill. He had to alight with his enormous load from time to time in order to rest, but he eventually landed with it on his nest, where he was boisterously received by his hungry family.

Another bird which is not less amusing and interesting, and which visits London year by year, is the Magpie. Every spring three or four of these birds appear in our parks and begin very

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busily to collect material for nests. Last year a pair of Magpies built three nests in succession (as these birds often do) in Green Park, but nothing came of all this show of setting up housekeeping. The birds never seem to go any further with it, and I do not know any instance of their bringing up a brood in London for fifty years past. They are not regarded with more favour by keepers than are the Carrion-Crows, for they are equally unprincipled and are particularly fond of Pigeons' eggs. They are said, too, to tease the water-fowl, and certainly they are mischievous enough for anything.

One of the most familiar and certainly the most picturesque of the birds in many provincial towns is the Jackdaw, whose interesting antics and high-pitched voice enliven many a church tower or cathedral close. It is strange that very few Daws take up their quarters in London. Of London's 1600 churches those inhabited by Daws can be counted on the fingers of one hand. Their place is more than occupied by the flocks of Pigeons which crowd every building, but though these are pretty enough in their way, they are not interesting birds like the Daws. A few of the latter birds frequent the old elms in Kensington Gardens, but they are a sedate and melancholy company, and seldom indulge in the mad frolics of their kind. Now and then they seem to be aroused from their lethargy when a flight of Rooks passes over the gardens, for the birds have a curious liking for one another's society and the Daws are always eager to give the Rooks an escort of honour over the town.

As to the Rooks, they are not uncommonly seen about town from time to time. Many of them roost in winter in the out-lying districts and visit the central parks during the day in search of food, the Daws being on such occasions always eager to receive them. There are a few small movable colonies of Rooks in several parts of London, and Gray's Inn has its rookery. There used also to be one in Temple Gardens, which was founded in Queen Anne's time by a famous lawyer of that

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period in a very curious manner. There was a rookery on his estate at Epsom, and as he was very eager to see the birds established in the Temple, he hit on the brilliant plan of attempting to plant a cutting, so to speak, of his Epsom rookery there. A bough bearing a nest containing two young birds was removed from a tree and taken in an open waggon to the Temple Gardens, the old birds following anxiously in the wake, no doubt in great distress and wondering what was being done to their little ones. On arriving at the Gardens, the bough, together with the nest and young Rooks, was fixed in one of the trees, and there the old birds fed their progeny and brought them up, eventually remaining with them to found a new colony. The following year this was reinforced by substituting Rooks' eggs for those of a Magpie which had built its nest in the Gardens, and the eggs were safely hatched and reared.

Public interest in birds has very greatly increased in recent years, and they are everywhere treated with more kindness and consideration than was formerly the case. The birds seem to be quite well aware of this, if one may judge from the way in which species which were formerly never seen in great cities are now regular visitors to or constant inhabitants of the town.

At the present time Wood-Pigeons, which are amongst the shyest of birds in their usual haunts in the country, are so common in London that their presence excites no remark. Twenty years ago, however, they were still few in number; and I well remember my delight when a pair of them built in a tree quite close to my windows overlooking Lincoln's Inn, in the spring of 1895. As the nest was a few feet below the window I was able to watch every movement of the birds and to see them successfully rear their young amidst the roar of traffic passing to and fro along the Strand. What was still more unusual was that in the same year a pair of Turtle-Doves attempted to build in the same tree, but these very rare visitors unfortunately did not remain many days, and I am not aware that any have been known to nest in London since that time.

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At present Wood-Pigeons are to be seen in many parts of the town, and have even taken to nesting on houses and other buildings, just like the semi-domestic Pigeons which preceded them and which are now their companions. Most of them, however, still nest in trees in the parks and squares. They seem quite to have lost their shyness, and may even be seen feeding in the streets with the other Pigeons, from which they may be distinguished by the broken collar of white about the neck.

Moorhens were formerly as rare as Wood-Pigeons, but are now quite widely distributed, wherever there is a pond with a few rushes. At first a few stragglers came to town as summer visitors and went away again before winter, but at the present time they stay all the year round where they can find even a moderate amount of shelter and seclusion. Though very timid in their wild state, these birds soon get used to men and become almost semi-domesticated, though they always remain wary in their attitude towards any unaccustomed object. They are very graceful both on the water and on land, and invariably make their appearance on the latter after a shower to look for food amongst the grass, in company with Blackbirds, Starlings, and Thrushes, walking about slowly and sedately with the short tail jerking up and down in a comical manner at every few steps.

Far more timid are the little Dabchicks, which first appeared in one of the parks about a quarter of a century ago, and since then have become more numerous. I believe, however, that these birds never stay all the year round, though in summer they often build their raft-like nest of weeds amongst the reeds about the margin of the ornamental waters. Sometimes the nest breaks from its moorings and floats into the open, greatly to the distress of its owners.

The commonest of the water-birds are of course the Ducks. The Ducks in Hyde Park are descended from the true Wild Ducks which were introduced years ago, and their descent is still to be traced in their habits. By day, as every visitor to

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the parks knows, they are perfectly tame and will swim close beside the margin of the water eagerly snapping up the fragments of bread and other food thrown to them by children. But if you visit them at twilight you find that they are far more difficult to approach. They become wary at nightfall, and on autumn nights fly about the park and gardens in flocks, alighting from time to time to feed on the grass, just as they would do in their wild state. Even by day they often make short flights, wandering from the Serpentine to the Round Pond and back again.

Many of them have found that the safest place to make their nests is in holes in the large elms. How the young Ducklings ever reach the ground from these nests, some of which are at a great height, has puzzled many people. As a matter of fact, as soon as they are old enough to be moved—that is to say, very shortly after being hatched—their mother takes them in her bill and drops them one by one to the ground. This rough treatment never seems to do them any harm, for they find their way to the water and are soon discovered swimming about quite happily. One nest was built, some years ago, in a very deep hollow of a tree which had been broken off at the top, yet the Duck somehow contrived to get her offspring out of the chimney-like shaft, though how she managed it is more than we can tell, since there was certainly not enough room for her to spread her wings. Some have nested in Holland Park, and have been known to try to lead their chicks to the water through the streets, much to the amusement of the passers-by.

Small birds, of course, there always are in plenty, in nearly all towns. Sparrows, it need hardly be said, are the most numerous of them all, and after them come the Starlings. Blackbirds and Thrushes seem to be almost as plentiful, wherever there is a fairly large open space with healthy trees, as they are in the country, and Tits of various kinds constantly frequent many gardens. An excellent way to encourage and attract Tits is to hang a bone, a piece of suet, or the half of

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a cocoanut which has been sawn in two, at the end of a string ; before very long, especially in winter, one or two of these attractive little visitors are pretty sure to be seen climbing over it and enjoying the hospitality which is offered to them.

It would be tedious to give an account of all the birds which are to be found from time to time even in London and other large towns in England, but a few of the more occasional visitors may be just mentioned. Amongst these we meet with some surprises. Twelve or thirteen years ago, a gentleman who had a large old garden adjoining his house at Wandsworth saw in it at different times several Hawks, Pheasants, and even a Heron. Since that time Herons have acquired the habit of flying down the river at dusk from Richmond Park to their fishing-grounds, sometimes venturing as far as Chelsea ; and although, as is well known, they are amongst the most retiring of our British birds, they have so far overcome their natural shyness as to fish close to the houses, and only a few yards from the road.

Two years ago, on several occasions in the very early morning, I heard in Kensington Gardens what appeared to me to be the tapping of a Woodpecker. I had very little doubt as to the cause of the sound, which was so characteristic of that bird as to be practically unmistakable, but since Woodpeckers are certainly not counted among our town dwellers, or even occasional visitors, I was very anxious to get sight of the bird. In this, however, I was not successful. Few birds can be more elusive than a Woodpecker, which will dodge round the trunk or limb of a tree in the most agile manner, always contriving to keep just out of sight. Greatly to my regret, therefore, I came to the conclusion that the matter must remain for ever undecided, and though I felt pretty sure that it really was a Woodpecker that I had heard hammering on the tree, it was impossible to prove it.

Early last spring, however, when it had been discovered that many of the old elms were badly decayed and were in a dangerous condition, a great number of the trees were

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shortened and lopped, the portions which were most extensively decayed being removed. Passing through the gardens one day, just after this had been done, I was examining a large pile of the wood which had been cut down, and in one section of a thick, hollow limb I discovered a round hole almost as cleanly cut as if it had been made with a drill—exactly such a hole as is bored by a Woodpecker. That it had not been made with a drill was certain, for it was not exactly round, but only nearly so. The lower edge of it was slightly worn, but no natural rounding of the edges of the bark had taken place, so that the hole could not have been pierced at any very distant date, though it might quite well have been made in the previous year. Unfortunately it was only a few inches from the cut end of the branch, and the bottom of the hollow cavity had been removed; it was impossible, therefore, to ascertain whether there were any traces of a nest, though it was evident that the hole had been frequented by birds. But the discovery of the neat round opening left me even more firmly convinced than before that in the previous year Woodpeckers certainly had paid a visit to Kensington Gardens, though they might not actually have stayed there to rear a brood of youngsters.

The life of the smaller town birds, even in parks, is full of peril, otherwise no doubt they would be far more numerous. Their great enemies are cats, which nightly make hunting excursions from the houses round about and pounce upon the birds as they are at roost among the bushes. Unfortunately nothing can be done to prevent this evil, for it is impossible to keep the cats away from the open spaces. The entrance into a city, too, is fraught with danger. Arriving by night, as many birds do, attracted by the glow of countless lights, they often come into collision with the network of overhead wires which is spread all over the town, and are either killed at once or so badly injured that they fall easy victims to prowling cats.

The town-dweller who is a lover of birds has one advantage

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over the countryman. In parks where they are carefully protected from interference by men or boys, and where the sound of a gun is never heard, where too they become thoroughly accustomed to the sight of people passing to and fro, birds which in the country are quite shy and retiring in character become far bolder and more familiar. They go about their business without paying much attention to anybody, and it is therefore possible to watch them at closer quarters than in the country, and to observe their movements quite easily without the aid of field-glasses. Something of interest is to be seen in almost any park or open space. A walk across Kensington Gardens, for example, may be full of incident. As you enter the gate you probably hear a Thrush singing from one of the highest twigs of an evergreen oak. Close by on the grass his mate is moving along with a series of vigorous hops, stopping every minute to listen with head on one side, running on again, now in a slightly different direction, listening once more for a moment, and then suddenly pouncing upon the worm for which she has been searching. Not far off a Blackbird is singing, and as one approaches the pond a number of Ducks, clamouring loudly, fly off eastward towards the Park, occasionally falling more or less into the >-shaped formation which their wild ancestors used to assume when on the wing. A few Gulls are still circling round on light, easy pinions over the water, and in the shallow margin two or three Sparrows are almost certainly taking a leisurely bath. A pair of sturdy Wood-Pigeons fly in a business-like way from the upper branches of one tall tree to another, where Doves and Starlings may be their neighbours; and in a high elm, silhouetted against the sky, a Carrion-Crow keeps solemn watch beside his nest and mate. Other birds there are, visible to those who have learnt to know them and their ways, but those I have mentioned may be seen in the course of a ten-minutes' walk from gate to gate in this happy hunting-ground for the City bird-lover.

CHAPTER XIX

FISHING

Fishing from a stand—Kingfisher and Heron—How the fish are swallowed—Fishing Crows—A boisterous fishing-party: the American Wood-Ibis—Bills and claws of fishing birds—Birds-of-Prey as fishers—A romantic family history—Fishing in mid-air—The diving birds as fishers—The Darter's spring-harpoon—'Master of the Royal Cormorants'—Fishing with Cormorants—A fishing-fleet of Pelicans—The capacity of a Pelican's pouch—The Skimmer: ploughing the waves—Opening shell-fish—The follow-my-leader fishing of Gannets.

THERE is almost as much variety in the methods employed by birds in their fishing as in those adopted by fishermen, and if we consider for a moment how diverse in form and structure are the species which follow "the gentle art," how different the implements with which nature has provided them, and how varied the conditions under which they carry on this pursuit, we shall see that this must be so. It is obvious that the long-legged, stately Heron would be quite at sea, in more senses than one, if he went fishing with the sturdy, short-limbed Penguin, and that a Fishing Owl would prove a very unsatisfactory companion for an Albatross or a Frigate-bird. We have to consider, therefore, the different ways in which birds whose diet consists more or less of fish earn their living.

It happens that the most brilliant of our native birds, and the most picturesque, are both to be numbered amongst the fishers which haunt our streams and ponds. No other British bird can compare in brightness of plumage with the little Kingfisher (*Alcedo ispida*), with its gleaming blue-green back and rich chestnut breast; while the conspicuous form of the

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Heron (*Ardea cinerea*), its commanding presence and long pendent plumes, have been made familiar by artists all over the world. It would be difficult to imagine any birds more exactly fitted than these to give the final touch of beauty to the landscape they adorn. The clear, rippling stream, softly shadowed at intervals by leafy boughs and bordered by the rich green herbage upon its banks, relieved here and there by the contrasting colour of the bare earth where the bank rises sharply in a steep escarpment, forms a perfect setting for the gorgeous little bird that sits, watchful and patient, upon an overhanging bough or darts swiftly over the stream, flashing and gleaming with blue reflections as it crosses the patches of sunlight; the level, reedy margin of a great pool or shallow estuary accentuates the decorative form of the picturesque Heron, and harmonises perfectly with its fine grey back, its black-streaked throat, and snowy breast, as well as with its leisurely movements and air of calm repose.

Both Heron and Kingfisher generally play a waiting game when fishing, and both use the bill for capturing their prey. It is sometimes stated that the Kingfisher seizes fish with its feet; it is difficult to understand how such a belief arose, for these members are remarkably feeble and quite incapable of being put to such a use. Its ordinary method of fishing is to sit—sometimes for hours together—on a projecting twig or rock, watching the stream with a sharp eye to the movement of any small fish or aquatic insect. Occasionally it moves its head back and forward or shakes its wings and suns itself. Should an unfortunate fish come in sight, the lone fisher is at once thoroughly alert, craning its neck and watching it narrowly until, choosing a favourable instant, it plunges head first almost perpendicularly into the water and emerges a moment later holding in its long bill a gleaming fish which vainly struggles to escape. Sometimes the bird remains under water for several seconds in pursuit of its prey; and occasionally it fails altogether to secure it, but that is rare.

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Having caught its fish, the Kingfisher returns to its perch and proceeds to reduce it to a helpless condition before swallowing it. I have often watched this process, and on every occasion it has been performed in the same manner. Holding the fish firmly in its beak, crosswise, the bird gives its captive two or three quick bites, jerking it sideways a little after each one so as to injure it in a different place every time. Then, with a vigorous movement of the neck, it beats the fish's head against the rock or bough on which it is perched and so stuns it; there is more biting, and again two or three sharp blows; and with a dexterous jerk the fish is brought lengthwise into the beak and swallowed. It is an almost invariable rule, not only with the Kingfisher but with all fish-eating birds, to swallow their prey head foremost; if the other way were tried it might have uncomfortable results, because the fins, which point backwards towards the tail, would often stick in the bird's gullet. A gluttonous Cormorant has in its haste occasionally been known to make a mistake and to attempt to swallow its prey the wrong way round; but even these birds, which can bolt almost anything, have sometimes to recognise their error and start afresh.

The Kingfisher usually has two or three favourite perches, which may be a considerable distance apart, along its own particular range of stream, but it does not always fish from a stand in the way already described. Sometimes it hovers like a Kestrel over the water, first in one spot and then in another, moving from place to place in short, rapid flights until it detects a victim and makes its plunge. This method is most often resorted to where fish are plentiful and perches few.

Though these charming birds are to be found in most districts, they are nowhere very numerous. This may be accounted for in two ways. In the first place, their great beauty makes them irresistibly tempting objects to the kind of 'sportsman' who can never look at a beautiful bird of any sort without wanting to kill it; and they are also shot and

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netted in great numbers on account of the utility of their feathers in making artificial flies for fishing. Severe weather is, however, the birds' greatest enemy. During a hard frost, when the streams and ponds are frozen over, they resort for food to the seashore, but many individuals perish on the way before they can reach the tidal waters.

Since these birds have been protected by the various public bodies concerned, they have become far more numerous than they were formerly along the Thames, and Mr. Cornish, who wrote so delightfully of that river, describes how he one day saw a number of them at play. "It was a brilliant, warm, sunny morning, such as sometimes comes in early winter, and I went down before breakfast to Clifton Bridge. There the shrill cry of the Kingfishers was heard on all sides, and I counted seven, chasing each other over the water, darting in swift flight round and round the pool, and perching on the cam-shedding in a row to rest. Presently two flew up and hovered together, like Kestrels, over the stream. One suddenly plunged, came up with a fish, and flying to the other, which was still hovering, put the fish into its beak. After this pretty gift and acceptance both flew to the willows, where, let us hope, they shared their breakfast."

Some Kingfishers live most entirely in forests and feed on insects, but they all have the habit of perching motionless on the look-out for prey, like a cat watching for a mouse, and pouncing upon it when it appears. One species (*Pelargopsis leucocephala*), which is common on the rivers and tideways of North Borneo, perches at the top of a high tree and watches for fishes swimming on the surface of the sea, sometimes at a considerable distance from the shore.

We may remark in passing that some members of the Crow family turn their attention to fishing, and give a very creditable performance. I have never seen English Crows catching fish, but from the bridge over the Serpentine in Hyde Park a friend of mine recently saw one, after two unsuccessful attempts,

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take from the water a dead fish about half a foot in length ; and I have on more than one occasion seen them skilfully retrieve floating pieces of bread or other scraps of food which had been thrown overboard from ships and barges. The American Crow (*Corvus americanus*), however, has frequently been observed fishing at low tide in much the same way as a Kingfisher, watching for fish and diving after them from a pier. Instead of plunging almost straight down as a Kingfisher does, the Crow strikes the water at a sharp angle, like a Swallow, and *skims* up again.

The Heron does not need either bough or post to stand on when he goes fishing ; his own long legs give him a sufficiently commanding position, and his large feet prevent him from sinking in the mud. In a well-stocked stream he usually does his fishing from a single stand, waiting motionless with his long shanks in the shallows and his neck half drawn back in readiness until chance brings a fish within reach of his bill. His head then shoots down with the swiftness of a bolt released from a crossbow, and comes up again immediately with the fish held a hopeless prisoner in the sharp bill. If fish are not plentiful, he wades about in search of them ; and sometimes, when out of his depth, he swims.

His method of dealing with the wriggling prey differs from that of his small rival, the Kingfisher ; he does not go through the formality of beating and biting it until its struggles cease, but with a few deft jerks of his head, in a quiet, business-like way, he brings it into a favourable position, and with a final snap it disappears and is swallowed, the way being made easy for it by stretching out the head and neck in one straight line. Where they are plentiful, eels form a large part of a Heron's diet. Sterland, in his *Birds of Sherwood Forest*, mentions a strange accident which befell one of these birds while eel-fishing. It was found dead on the edge of a fishpond, and the way in which it had lost its life was remarkable. It had speared a large eel through the body with its sharp bill without

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absolutely killing it, and in its death struggles the eel had wreathed itself round its captor's neck and had at the same time coiled round some aquatic plants on the bank. The consequence was that the fish held its enemy prisoner, and both were found dead together.

In the old days when falconry flourished as a sport in this country, Herons were protected both by law and custom on account of the fine flights they afforded. Nowadays most of the great heronries have been broken up and the scattered birds are much persecuted. One even hears from time to time of rewards being offered for their destruction by the Conservators of a river on account of the immense damage they are said to do to the fishing, but it is very doubtful whether they deserve quite such a bad character as is given to them, because although they have a partiality for fishes, the eels and flounders which form the bulk of what they eat in the estuaries cannot be a very serious loss, and a large part of their diet consists of frogs with an occasional small mammal or young bird. Even rats are not despised—at all events, a Heron has often been seen catching and killing them by beating them violently on the ground, and afterwards carrying them away, so it seems quite likely that he eats them too.

The methods of the American Wood-Ibis (*Tantalus loculator*) are very different from those of the quiet Heron. These birds form immense fishing-parties of hundreds, or even thousands, of individuals. Seeking in company the shallow margin of a muddy lake abounding in fish, they dance and tramp about and stir up the mud from the bottom with their feet until the water becomes quite dark and thick. This causes the fishes to rise to the surface, where they are struck by the beaks of the Ibises and killed. In the course of a quarter of an hour or so the surface of the water is covered with hundreds of dead fishes, frogs and other animals, even young alligators sharing the general fate. The birds then feast greedily upon them, the clacking of numerous bills being audible quite a long way

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off, until at last they can eat no more, when they march off to the nearest bank and stand in long rows, all facing one way, sunning themselves.

We have seen that Kingfishers, Herons, and Ibises all catch fish with their bill, seizing, striking, or spearing their prey with a quick, powerful movement of the head. In such birds the bill is peculiarly adapted to its use: the Heron's bill, for example, is long and sharp, like the head of a lance; and in some cases the margins are more or less roughened, or *serrated* as we say, like the edge of a saw, for the better holding of the prey.

Many birds, however, instead of striking the fish with their bill, seize it with their feet, and in such cases it is the foot that is specially constructed for holding the slippery captive, for not only are the claws sharp and curved like so many little hooks, which can be driven into the fish, but the sole of the foot has a rough surface which enables the bird to hold its prey still more securely.

This kind of foot is possessed by the Fishing Owls (*Ketupa*) of India and Ceylon and the countries of Eastern Asia. One would have imagined fishing to be a most uncongenial occupation for an Owl, but these birds pursue their calling with considerable success, perching beside the margins of ponds and rivers and pouncing upon any fish or crab that comes within reach. Like most of the family, the Fishing Owls remain concealed by day and only start out on their excursions in search of food at nightfall. There is, however, another Owl which sometimes goes angling, and which, being a native of the far north, where in summer there is no night, appears to be able to hunt equally well by night or by day. This is the Snowy Owl (*Nyctea nivea*), one of the boldest of the family. It is not a regular fisher, for its diet usually consists of wild-fowl of various kinds and small mammals, but Audubon had the good fortune to see some of these birds angling while he was out shooting Wild Ducks near Louisville; for during the winter the birds leave the snowy regions of the far

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north and migrate to warmer latitudes. They were watching for their prey beside the 'pots' at the falls of the River Ohio, and were lying on the rocks with the body placed lengthwise close to the margin of the pot-hole and the head turned towards the water. So still were they that they looked as if they were sound asleep, but they were really very wide awake indeed, for as soon as a fish rose to the surface within reach, a foot was instantly thrust out with the quickness of lightning, and the unhappy fish was seized and pulled out of the water. The wily bird then carried its prize a few yards from the margin of the pool and devoured it, afterwards returning to practise the same clever trick on other victims. Sometimes the fish was too large to be easily pulled out with one foot, and had to be gaffed, so to speak, with the other foot before it could be landed.

The Osprey's fishing is described in another chapter, and there are few more delightful spectacles for a lover of birds. The fine flight, the careful poise with upright body and quickly beating wings, the tremendous plunge, like a plummet, into the water, the sudden reappearance, a moment later, from the bosom of the lonely lake, amidst a shower of sparkling drops shaken from the plumage, with a silvery fish gleaming and struggling in the grasp of the strong claws—surely that is a romantic sight! Unhappily, though the Osprey is one of the most cosmopolitan of birds and is found in nearly all parts of the world, it is a sight that can now rarely be witnessed in these islands, where persecution has almost extirpated the bird except as a chance visitant.

There are, however, a very few eyries, of almost immemorial date, where the Ospreys are afforded protection by great land-owners, and continue their line year by year, though not without vicissitudes. Such an eyrie is that on the summit of the small, square turret of the islet castle of Loch-an-Eilan, beside the Cairngorm Mountains. The record of this goes back to 1824, but it may have been in existence long before then. The

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tenancy was probably continuous each year until 1872, when the male bird was unfortunately shot, and though the female returned in the first week of April of the two following years and waited in the nest for her old mate, she at last disappeared, and for several years the eyrie was deserted. But in 1878 a pair of Ospreys once more appeared on the loch and repaired the turret nest, which was regularly occupied every season during the next decade. In the April of 1888 a pair arrived as usual, but the female was a young bird and a stranger. Not many days later a second female appeared, and then began a battle royal between the rivals which was waged for two whole days from dawn till dusk, almost without intermission. On the third day the young usurper suddenly rose from her nest and pouncing upon her rival struck her a blow which hurled her into the lake, where she was ruthlessly pursued and left floating dead. But the house did not prosper: no eggs were laid, and in a few days the birds flew away and never returned together. Each year afterwards the male Osprey made a pilgrimage to his old home and remained there for a few days, calling for his mate to return to him; but it was not until the spring of the seventh year that he found a partner to share with him the ancient eyrie.

To resume our subject of fishing. Where flying-fish are abundant one might expect the Osprey to secure its prey in mid-air, like other Birds-of-Prey, but it always waits until they have resumed their swimming and follows them into the water. So far as I am aware, the Frigate-bird is the only species which ever carries on its fishing in mid-air, waiting until the flying-fish are startled from their native element by some of the larger species of fish which prey upon them, such as albigores and bonitos, and seizing them before they can regain the water. We all know Mr. Kipling's verses—

On the road to Mandalay,
Where the flying-fishes play;

but, what with the bonitos below and the Frigate-birds above,



THE OSPREY'S HOME ON LOCH-AN-EILEIN
The scene of a romantic story of bird life.

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the fishes have somewhat peculiar ideas of play if they altogether enjoy the sport.

Anybody who has observed the speed with which the flying-fish skims through the air during its short flight will appreciate the astonishing swiftness and adroitness of the bird which can snap it up—if that is always the correct phrase. I am not quite sure whether it is, because the Frigate-bird is provided not only with a long bill with a dangerous-looking hook at the end, but with strong, curved claws, one of which is toothed, and which certainly look exactly as though they were intended for seizing a slippery fish. The Heron, it will be remembered, has a similar toothed claw; but it has been suggested that it may be used as a sort of comb to help in putting the feathers in order. However that may be, the Frigate-bird does seize its fish on the wing, and when it cannot do that it has to resort to piracy, for it is not known either to dive or swim after its prey.

Having caught its fish, the Osprey turns its head foremost if it is not already held in that position, squeezes it to put an end to its struggles, and dashes away to its young or to a favourite dining-spot. Sometimes a very large fish is seized, and there are instances on record where this has proved fatal to the bird, which, being unable either to raise its prey from the water or to extricate its hooked claws, has been drowned.

Several other Birds-of-Prey go fishing, from the large Grey-headed Fishing Eagle (*Polioaëtus icthyaëtus*) to the little Brahminy Kite (*Haliastur indus*), which abounds in Calcutta and other parts, and may be seen perching on the rigging of craft at anchor and darting down to pick small fish or refuse from the surface of the water.

In the chapter on Swimming and Diving it has been mentioned that the excursions under water of the birds which practise these arts are made in quest of food. Sometimes they dive to escape an enemy, or merely in high-spirited play, like the Penguins; but fishing is the usual object, and if a fish has

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little chance of escape even from the birds which can only plunge beneath the surface for a few moments, as we have seen to be the case, it is clear that it has still less chance against an enemy almost as thoroughly at home in the water as itself. As a matter of fact, a Darter (*Plotus*) or a Cormorant is a match for almost any fish that swims. The Darter is particularly well equipped for its pursuit, because its sharp spike of a beak can be thrust forward with almost incredible swiftness, on account of the structure and arrangement of the bones and muscles of the upper portion of the neck, which produce the effect of a spring. Bitterns have a similar spring apparatus, and so, in a less degree, have Cormorants, Gannets, and Pelicans. A Darter will devour at a single meal forty or more fishes three or four inches long.

Cormorants have several methods of going about their fishing. One way is to pounce from a convenient perch, like a Kingfisher; at other times they swim swiftly on the top of the water with the head submerged; but usually they swim under water.

Cormorants are particularly interesting, because in China they are frequently trained and kept for fishing, just as Hawks are trained for flying at quarry, and the sport is not altogether unknown in this country. In the time of James I. there was a Master of the Royal Cormorants, and the King had a regular establishment for his Cormorants on the river at Westminster.

In one of the official documents of the time John Wood, who was the first to hold the office of Master, is described as Keeper of His Majesty's Cormorants, Ospreys, and Otters, so it is evident that fishing with Ospreys was also tried; but as little is anywhere said of it we may assume that the sport with these birds, as with the otters, proved a failure.

In his *Embassy to China*, Sir George Staunton relates that during the journey to Hau-choo-foo, "the Embassy had not proceeded far on the southern branch of the canal when they arrived in the vicinity of the place where the . . . famed

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fishing-bird of China is bred, and instructed in the art and practice of supplying his owner with fish in great abundance. On a large lake . . . are thousands of small boats and rafts built entirely for this species of fishery. On each boat or raft are ten or a dozen birds, which, at a signal from the owner, plunge into the water; and it is astonishing to see the enormous size of fish with which they return. . . . They appeared to be so well trained, that it did not require either ring or cord about their throats to prevent them from swallowing any portion of their prey, except what the master was pleased to return to them for encouragement and food. The boat used by these fishermen is of a remarkably light make, and is often carried to the lake . . . together with the fishing-birds, by the men who are there to be supported by it."

In England, and I believe in China too, it was certainly usual to place a ring or a leather thong round the lower part of the bird's neck to make the swallowing of its prey impossible. At first sight this appears to be a rather cruel proceeding, but it is not really so, because Cormorants' gullets are very capacious and elastic—so much so that the Greenlanders use them, tied at the ends and distended with air, to float their fishing-nets. Even with the strap on, the bird can find room for a two-pound fish, and in its wild state it has been known to take them still larger. One bird which was shot was found to have swallowed a four-pound grilse—or the greater portion of it, for the fish had proved to be rather longer than the accommodation at its disposal, and part of it was still outside the bill.

There have been several attempts to revive the sport of fishing with Cormorants in this country, and a few birds are still kept for the purpose. In the old days it was the practice to hood the birds like Falcons while carrying them to the river. On arriving at the bank the hoods are removed, the strap adjusted about the neck, and the birds thrown into the water. Diving with wonderful swiftness, descending in a spiral direction (as Falcons mount) if the water is deep, they pursue

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the fish and, having caught one, rise with it to the surface, where they swallow it, afterwards diving again in quest of others. In this manner each bird may stow five or six fishes in its gullet. The keepers then call them to the fist, to which they readily return; little by little and one at a time they disgorge their fish, in perfect condition except for the slight bruise where they have been nipped by the bill. When all have been given up each bird is rewarded with one or two fishes, which it catches dexterously in its mouth.

Perch and other fish with a similar back-fin cannot be disgorged, and the bird must be allowed to swallow them or its pouch may be lacerated. Eels are a favourite form of prey, but as they have the annoying habit of wriggling either down or up after being swallowed, they spoil the fishing.

The fish seem to know their green-eyed foes by instinct, and if there is a muddy bottom to the stream they generally try to bury themselves. Sometimes they jump right out of the water in their efforts to escape pursuit; but they are seldom successful, for a Cormorant can catch even grayling, which are swifter than trout, by fair coursing in open water.

The fish is usually caught by the middle, but sometimes the deadly hooked bill snaps a fraction of a second too soon or too late, and closes on nothing but a fin or the tip of the tail; in that case the prey may get away again, but only for a moment, for the Cormorant is sure to overtake it with a dive of lightning swiftness.

The birds are very cunning and peer into every rat-hole and under every shelving bank. It is seldom indeed that a fish escapes, and those that are so fortunate usually do so by suddenly doubling. The birds are extremely agile, however, and Mr. Salvin once saw his trained Cormorant 'Isaac Walton,' an exceptionally skilful fisher, exhaust a large trout by spinning round and round it at great speed with its neck and tail turned inwards, the fish meanwhile making vain efforts to escape from the deadly circle. People who have had experi-



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Cormorants are frequently trained for fishing in China, and the sport is not altogether unknown in England. The birds are very agile under water and can catch even the swift grayling. A ring or strap is placed round the neck to prevent them from swallowing the fish.

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ence of fishing with Cormorants have noticed that most fish appear to become exhausted very quickly when pursued, seldom swimming more than fifteen or twenty yards.

When a large fish has been captured the bird works it round with its beak until the head is in the right direction and then gulps it down; but small fish are tossed in the air and caught head foremost, with all the skill of a clever juggler. Mr. Salvin's Cormorants frequently caught water-rats, and he once saw one of them take a diving Moorhen, but the feathers appeared to annoy it, and the captive was soon released and made off with all speed after its unpleasant experience.

After catching and eating their dinner the Cormorants attend to their toilet, drying themselves by flapping their wings and standing with them half spread in the peculiarly dejected attitude which is so characteristic of these birds, before carefully oiling their feathers ready for the next dive.

Cormorants are sometimes extraordinarily self-possessed from the day they are caught, and not at all difficult to tame, though it takes some time to train a bird thoroughly. Montagu had one which was caught in the Channel and which, immediately it had been received and liberated, followed the servant who released it and, after being fed, sat perfectly contented on a stool, putting its plumage in order. Montagu left it at its toilet and retired to his library with a friend, but they had not been there very long before the bird walked in and settled down quietly by the fireside, where it resumed its task of preening its feathers. From that time forward it remained perfectly tame, never going far from the house; whenever the door was left open it walked in with the greatest assurance, without paying the slightest attention to anybody. It did not even show respect for a dog—in fact it was, we are told, “troublesomely tame.” After being in Montagu's possession for several years, the bird eventually found an honourable resting-place in the British Museum.

In his delightful book, *A Breath from the Veldt*, Mr. Millais

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describes a method of fishing practised by the little Green Cormorants (*Phalacrocorax capensis*) on the coast of South Africa, which, so far as I am aware, is not resorted to by any other marine bird with the exception of the White Pelican. As a rule they dive independently like other Cormorants, and I have not seen them fish in any other way, but Mr. Millais says that, should the traveller be so disposed, the interesting sight which he describes may be witnessed any day. Food being excessively abundant, the birds have discovered that they can obtain a full stomach with far less trouble by uniting their forces, and the plan which they adopt is this. Ten or twenty of them form a line, the birds being about two feet apart, and in this order the whole company swims close to the shore and at right angles to it, the nearest bird being so close to the beach that it can only just float. As they move onwards they keep a sharp look-out by plunging their heads beneath the surface, until they come upon a shoal of small fish. Then, like a line of soldiers, they wheel round towards the shore, most of them diving in order to frighten the fishes and drive them towards the beach. In this way very large numbers of fishes are forced into the shallows, and in their confusion many of them dash ashore, where they are gobbled up as they leap about in their efforts to regain the water.

Cormorants have a strong musky odour; whether this has any effect in attracting fishes I do not know, but according to Jerdon, that is stated to be so in the case of another bird, the Grey Pelican (*Pelecanus philippensis*) of Southern Asia. We are told that this Pelican is used by fishermen in some parts of Eastern Bengal as a decoy to assist in catching certain sorts of fish, such as the various kinds of *Colisa*, which are said to be attracted by an oily secretion which exudes from the bird's skin. The cruel custom was to sew up the Pelicans' eyes to prevent the birds from doing any fishing on their own account, and then to tie them to the boat. The White Pelican is said to be of no use as a decoy.

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The American White Pelicans (*Pelecanus americanus*), already mentioned, put to sea in company, like a fishing-fleet. Their favourite time for fishing is at the incoming of the tide, when multitudes of little fishes swim shorewards to feed on the various small living creatures which are overtaken by the tide, and larger fishes follow in the wake of the small ones to feed on *them*. The Pelicans wait patiently in solemn line along the beach until the time has come for action, when one of them yawns and begins to waddle clumsily through the shallows, others gradually following its example until all are fairly launched, when they fall into line and paddle onwards to where hundreds of small fish are dancing amidst the waters. Thereupon they turn towards the shore and, acting as though with one accord on the signal of their leader, suddenly abandon their placid demeanour. With a great flapping of their broad wings and much commotion, they begin to press closely forward with powerful strokes of their feet, driving the little fishes towards the shallows; stretching out their necks, they plunge the lower part of their great bills, spread wide like so many bag-nets, into the water, and scoop up whatever fish or other food may chance to come into them. When they have filled their pouches they waddle on to the beach again and stand close together or lie down while they enjoy in a leisurely manner the fruit of their fishing. After a fitting interval for repose and meditation the whole flock often takes flight and soars in circles at an immense height in the air.

If one of the birds be caught after a meal it at once disgorges all it has swallowed. It appears to be the easiest thing in the world for the fishing birds to do this; it is the regular and correct procedure as a preliminary to serious flight when pursued by an enemy to cast away all ballast, so to speak, and that probably accounts for the readiness with which a Gull or Tern will yield its latest meal when the demands of one of the bird pirates become really pressing.

Brown Pelicans (*P. fuscus*) have not yet learnt the advan-

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tages of combination; they do their fishing independently, often diving completely below the surface, and not immersing the head or bill only, like their white cousins. They swallow their prey as soon as it is scooped up, before making another plunge, only pausing to drain off the water from the pouch.

Though a Pelican seldom seizes a fish longer than its bill, its objection is merely to size, and not to quantity. An experiment was once made with a captive bird to see how much it would take into its beak. It began by trying to pick up a large fish weighing ten pounds, but was obliged to leave it because its bill was not strong enough to deal with such a heavy weight all at once. After this unsuccessful attempt it turned its attention to fishes of more modest dimensions, and eventually picked up ten smaller ones averaging about a pound apiece, trudging off with them, we are told, "very stately, with the bag hanging down to his feet."

Next to the Pelican's bag-net, perhaps the most curious apparatus for fishing possessed by any bird is the extraordinary bill of the Skimmers (*Rhynchops*), which resembles the blades of a pair of scissors, except that the two parts meet edge to edge instead of overlapping. In nearly all birds the upper portion of the bill, or *maxilla*, is fixed, the lower part only, or *mandible*, being capable of movement; but the Skimmer moves both blades, as we may call them, of its bill, which is thus still more like a pair of scissors. The mandible, which is as thin as a knife-blade, is nearly half as long again as the maxilla, and when the bird goes fishing it opens its bill and dips the lower blade into the waves as it skims over the sea. Moving lightly and gracefully with long strokes of its wings, which are held very high so that the tips shall not strike the surface, it ploughs the water, in which its quarry swims, to the extent of several yards at a time, dipping its bill whenever it catches sight of a small fish or prawn or other attractive morsel of food. Having seized its prey, the bird instantly rises to munch and swallow it on the wing.

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Apart from their singular bill, the Skimmers have the appearance of large Terns; but they differ from other Gulls in their habits as Owls differ from Falcons—that is to say, they rest by day and only begin to fly about in search of food as night approaches. When resting they lie flat on a sand-bank with their bills extended before them—not tucked away amongst the scapular feathers or under the wing. All day long they seldom move or utter a sound, but as the sun sets they begin to stretch themselves and hop about, until it gets dark, when they become quite talkative and seem to be making a lot of fuss about having to start work. Their cry is peculiar, and not unlike the barking of a rather lazy small dog.

Some of the birds nearly related to Skimmers are very skilful in opening mussels and similar molluscs with their beaks, and if we can rely on the accuracy of observations alluded to by more than one naturalist, which I do not feel sure about, the Skimmers themselves are particularly clever in this respect. Lesson states that he saw an American Skimmer sit down quietly beside some bivalves which had been uncovered by the outgoing tide and wait for them to open. As soon as the valves separated, the bird inserted its knife-like bill between them, with the result that the mussel, or whatever it was, closed its shell again quickly, gripping the bill firmly between the edges of the two valves. The bird then flew to a neighbouring stone and deprived the mollusc of its armour by beating the shell to pieces.

One of the most interesting sights around our coasts is to witness a flock of Gannets fishing on a calm day. During the nesting-season the birds remain for the most part in the neighbourhood of the rocky isles, such as the Bass Rock and Ailsa Craig, which they have so long colonised, but towards the autumn, when the young are ready to fly, they betake themselves to the open sea, where they follow the shoals of herrings and pilchards. By watching the birds' actions fishermen can tell where they will find a shoal of fish and in what direction it

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is moving. Gannets are almost entirely white, and are about as large as Geese—indeed ‘Solan Goose’ is one of the many names by which the bird is commonly known. They fly in single file when they have discovered their prey, and as each one comes over the shoal it closes its wings and dashes down into the waves, coming up again a few seconds later with a herring in its bill, several yards from the place where it made the plunge. Shaking the water from its feathers, it mounts in a wide curve and takes its place in a very orderly manner in the rear of the string of fishers, where it awaits its turn to make another plunge. This tremendous dive of the Gannet must be seen to be appreciated. The actual time taken from the beginning of the plunge to the moment when the bird reaches the sea is about fifteen seconds, so that when it strikes the water it must be travelling at a speed of several miles a minute! This speed is necessary in order to carry the diver deep enough into the water, for although it is so large a bird, the Gannet is extremely light owing to the extensive air-cells which pervade the whole of its body. It is literally as light as cork, and it bobs up to the surface after its dive like a bladder filled with air.

Gannets are singularly conservative in their choice of a settlement for nesting purposes. The number of rocky isles all over the world which they seem to regard as suitable is quite small; consequently the rocks which they *do* inhabit are covered with countless multitudes of birds and nests. In 1860 Dr. Bryant reckoned the population of Gannets on Great Bird Rock, on the western side of the Atlantic, at 50,000 pairs, but owing to the brutality of fishermen they were reduced to one-tenth of that number a quarter of a century later, and there appeared to be every chance of the species being exterminated in those parts. This brings us to an interesting subject in connection with bird-life with which we must deal in another chapter.

CHAPTER XX

BIRDS OF THE PAST AND VANISHING SPECIES

Persecuted birds—'Plume-hunters'—Early voyagers and the Great Auk—The fate of flightless birds—How the Dodo got to Mauritius—The trustfulness of island birds: 'Simpletons' and 'Boobies'—A Dodo in London—The doom of the Kiwi—The Roc in legend and fact—Giant birds—A family vault—Archæopteryx, the lizard-tailed, toothed fossil-bird—Didunculus, the toothed bird of modern times—A happy survival—A stupendous massacre: the story of the Passenger-Pigeons.

THE wholesale slaughter of Gannets by sailors on Great Bird Rock, to which we referred at the end of the last chapter, is but an instance of the kind of senseless action which has in other cases resulted in the extinction of a whole species. Birds which congregate during the nesting-season on some remote rock, or inhabit an isle of which they have for ages enjoyed peaceful possession, are often very tame; unaccustomed to the invasion of their sanctuary by man, neither instinct nor experience has taught them to avoid him, and before they can realise what a terrible creature has come amongst them countless hosts may be destroyed.

For some reason which we do not yet fully understand, many birds are so extremely conservative in their choice of nesting-ground that they seem to prefer to endure the greatest inconvenience from overcrowding rather than start a fresh colony elsewhere, though there may be other sites quite near which, so far as we can see, would be equally suitable for their purpose. The consequence is that during part of the year an entire species may be huddled together in a few small areas;

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hence it comes about that not only may a whole colony be exterminated within the space of a few years, but if all the colonies suffer persecution, as may easily happen when they are so few in number, the race may become quite extinct.

Is not that a sad thought? There is hardly a single species—perhaps not one—that is not either so interesting, or beautiful, or useful, or such pleasant company, that the world would be poorer for the loss of it. “When I hear of the destruction of a species,” says President Roosevelt, “I feel as if all the works of some great writer had perished.” And scores of species have been destroyed, and many more are being destroyed to-day; and very often indeed man is responsible.

It is true that man is not always to blame, however, for in many cases, as we shall see presently, the inevitable invasion of their territory has meant the inevitable death of the birds; but in other instances man is very much to blame, for he goes out of his way, at the bidding of milliners, to destroy wantonly, and often cruelly, some of the most beautiful birds in the world. I think we ought all to feel very angry about that. I have walked through a great warehouse in the city of London between interminable rows of benches on which skins of beautiful-plumaged birds were piled shoulder high. Hundreds of thousands of the most beautiful of created beings had been slain to furnish this ignoble mart—Humming-birds, Parrots, Quails, Blue Creepers, Argus Pheasants, Paradise-birds, and scores of other kinds. Nothing had been spared which could contribute to the making of that badge of ancestral savagery which otherwise-gentle ladies are not ashamed to wear upon their heads.

The most sickening sight was that of thousands of bundles and packets of so-called ‘ospreys’—the delicate bridal plumes of the White Egret. There is not a word to be said in defence of the slaughter of these birds. The plumes, under whatever name they are known—‘ospreys,’ ‘aigrettes,’ or ‘stubs’—are *all* taken from Herons shot during the nesting-season.

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Only then do they bear the coveted feathers; only then, while their usual shyness is overcome by their anxiety for the young in their nests, can they be approached near enough to be shot, and only by shooting can they be secured. As they return to their young they are killed, and the young are left to starve. It is now well known that all aigrettes are obtained by this infamous slaughter, but nothing will hinder it while people are willing to pay for the plumes several times their weight in gold. Already the American Egret and the Snowy Heron have been almost exterminated in the United States. Years ago, before the 'plume-hunters' got seriously to work, the birds were plentiful in Florida; now they are rarely seen, even in the swamp-wildernesses of that strange country, and though the killing of a Heron is punishable by a fine of five hundred dollars, the men who are ready to risk their lives in this abominable traffic are not likely to be deterred by any laws.

It is not the least deplorable part of a sad story that the birds which have been doomed to extinction in the past, and those which are disappearing or being ruthlessly destroyed to-day, are nearly all very remarkable birds. We cannot, of course, describe or even mention every one of them in a single chapter, but we will try to make the acquaintance of a few.

Within the lifetime of men who are still not *very* old, a curious bird which was once a native of these islands has been completely exterminated. This is the Gare-fowl, or Great Auk (*Alca impennis*), of which you have certainly heard, because from time to time—not very often—a paragraph in the newspapers informs us that a Great Auk's egg has been sold at auction for some astonishing price. About nine years ago, £315 was the sum paid for a single egg; it is true that the same egg was again sold quite recently for only £110, but even that comparatively small sum would have astonished our great-grandfathers. For of course nobody cared very much about these birds when myriads of them frequented the northern seas, or was particularly interested in them—except the sailors who

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provisioned their vessels with them. We learn from old narratives of voyages that they were at one time so abundant that mariners going to and from the New World carried but "small store of flesh with them," relying on the apparently inexhaustible supply of savoury "Pin-wings" (as they were called) and eggs, which they could obtain on the isles south of Newfoundland. These islands became regular victualling-stations, for in those times ships were not fitted with refrigerators, nor were there any tinned meats or condensed foods; it was therefore impossible to carry a supply of fresh provisions sufficient to last for more than a few days, and anything was preferable to the monotony and unhealthiness of a perpetual diet of salt pork and hard, worm-eaten biscuits. Rude stone enclosures were built where the Pin-wings were impounded before slaughter, and the hapless birds were herded like tame Geese and driven with sticks over a sail or planks into a boat, "as many as shall lade her," to be killed and salted down or pickled like pork. In the middle of last century, the stone pounds were still standing, but the Pin-wings had long all been dead: an island in the Newfoundland Sea—Penguin Island, so named by the early settlers and fishermen—commemorates their race.

This old name of Pin-wing, corrupted into Penguin, was appropriate, for like the birds which we call Penguins to-day, the Gare-fowl had diminutive wings which were quite useless for flight; they were admirable swimmers, however, though in the early days before they had become wary of man they could be overtaken by boats under sail. Afterwards, when it was too late, they learnt to avoid their enemy, and the latest survivors gave a good account of themselves. One of the last seen about our coasts, off the Orkneys in 1812, was chased for hours by men in a six-oared boat without being captured; eventually, however, it was taken by the boatmen, and its stuffed skin is now in the British Museum. In 1834, another Gare-fowl was taken alive at the entrance of Waterford harbour—and there is no account of any having been found in British waters since.

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The race lingered for ten years longer on an island reef off the coast of Iceland, but ultimately died out there also, the last two birds known to have lived having been 'taken,' as the collectors say, more than sixty years ago.

The latest colonies, on almost inaccessible rocks in the Iceland seas, were not so readily persecuted as those in more frequented regions, and some naturalists consider that it is by no means clear why they became extinct. But persecuted they were; occasional vessels made raids upon the unfortunate birds in their last asylum, killed all they could, and brought off all the eggs upon which they were able to lay hands. If it be true, as is stated, that these birds laid but one egg in the season, we need not wonder, I think, that they were exterminated.

Such then, briefly, is the story of the extinction of the Garefowl; first a tale of wholesale slaughter by early voyagers, then a period of ruthless persecution until there were but few survivors, and finally complete extermination of the dying species at the hands of collectors.

Probably some Penguins would meet with the same fate but for the happy circumstance that their native home is on the ice-bound shores of the Antarctic, where they are treated with consideration by the brave men who face terrible hardships in the interests of science, and do not visit those desolate regions to kill.

Whalers and seal-hunters, however, besides exterminating the Antarctic right-whale and killing nearly all the Antarctic fur-seals, did their best to exterminate the Black Swan of Australia, which they caught and killed in great numbers—whole boatloads at a time—for the sake of its down. But though this bird may cease to exist in the wild state, it is not at all likely that it is doomed to extinction, for its ornamental appearance, its sooty-black plumage relieved by the snowy white of the flight-feathers and the whole enlivened by an ivory-banded coral bill, will always make it a favourite captive in civilised countries.

Island animals of all sorts, if they have long been in undisputed

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possession of their home, are notoriously defenceless. Take, for example, that curious creature the sea-cow, discovered by Steller in the Aleutian Islands in the eighteenth century. It was an unwieldy animal about twenty feet long, with skin rough as the bark of an oak tree, a pair of flipper-like limbs in front, no hind limbs at all, a fish-like tail, and a head ridiculously small in comparison with its bulky body. Devoid of teeth (it had bony plates instead), it browsed peacefully on seaweed, and then went ashore to rest. As soon as its existence became known, sailors went to call upon it, and finding it quite palatable and large enough to keep a crew in meat for some time—it weighed several thousand pounds—they knocked it on the head and ate it. In about ten years there were no sea-cows left.

Unwieldy birds which cannot fly well are as certainly doomed to extinction as Steller's sea-cow when they are brought into contact with man and carnivorous beasts. There have been many such birds. One, of which everybody has heard, was the Dodo of Mauritius; then there were the big Crested Parrot of the same island, the Solitaire of Rodriguez, and the giant Moa of New Zealand, which are now as extinct as the Dodo. You will notice that all these birds lived on islands, and as they were unable to fly you may wonder how they ever got there. How, for instance, did the Dodo come to make its home on Mauritius—a lofty, volcanic island in the Indian Ocean, a hundred miles from anywhere, and surrounded by water more than two thousand fathoms deep?

There can be little doubt that this is how it happened. Long, long ages ago, a large ground-feeding Pigeon (the Dodo was really a kind of Pigeon, though it did not look in the least like any of the Pigeons with which we are familiar in these days) reached the island, travelling by way of other islands, which afterwards became submerged. For you must know that the surface of the land really does rise and sink, quite apart from the upheavals and subsidences caused by volcanoes or

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earthquakes which may cause an island to rise above the ocean or to disappear quite suddenly. The movement is very slow, but is always going on in some part of the world. Though we do not see much of it in England, elsewhere it is quite obvious. On the coast of South America, for example, an upward movement has been going on for a thousand years past, and is still taking place at the rate of half a foot or more every year. So you see that the ground-feeding Pigeon may very well have got to Mauritius by short stages in the way suggested, even if it was not a very good flier.

When it arrived, it found the island a pleasant place to live in, for not only was the country covered with virgin forest where it could get an unlimited supply of food, but there were no enemies powerful enough to attack it. Probably there was not a mammal of any kind living there, far less a beast of prey or other carnivorous animal. So the Pigeon became a permanent settler, and increased and multiplied unchecked. It lived on the ground, finding there its food and all that it required; having no further occasion to use its wings to escape, they gradually, through want of use, became smaller and weaker, as they did in the case of other birds in similar circumstances.

Amidst such conditions, indeed, wings might be a positive drawback, because the islands are sometimes swept by great hurricanes, and it is quite probable that birds which flew up into the trees to roost or tried to fly across rivers near the coast might be carried out to sea by the violence of the wind and drowned; while birds with wings too short to raise their bulky bodies easily, being content to remain on the ground and roost in the shelter of the forest, would escape such a fate, and would also be less liable to attack from any Bird-of-Prey that chanced to visit the island. For reasons such as these the sturdier birds with short legs and very small wings would be the ones to survive.

So, no doubt, it came about that when the island of Mauritius was first discovered by the Portuguese about the beginning of

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the sixteenth century, they found its most remarkable inhabitants were a race of large, ungainly, almost wingless fowls which they called *Doudos*, that is to say, simpletons, just as the Spanish and Portuguese sailors, and no doubt our own seamen too, called the sea-birds which they found inhabiting island rocks, and which used to alight upon ships and allow themselves to be taken by hand, *Bobos* or boobies. It is a characteristic of nearly all birds which have long existed undisturbed on a remote island to be 'simple.'

Cowley observed that when he was in the Galapagos Islands in 1684, the Doves "were so tame that they would often alight on our hats and arms, so that we could take them alive," and their education had not progressed very far when Darwin visited the islands about two hundred years later, for he saw a boy sitting beside a well holding a switch, with which he was killing Doves and Finches as they went to the water to drink. Darwin himself pushed a Hawk off a tree with the muzzle of his gun, and he tells us that the small birds came to drink out of a vessel in his hand. So it was on the Falkland Islands, and so too on the lone isle of Tristan d'Acunha in the far-off South Atlantic, where Thrushes and Buntings were easily caught in a hand-net, and where to this day the Albatrosses allow themselves to be approached when sitting on their nests without being in any haste to retire. One of the earliest visitors to Prince Edward Islands in the Southern Ocean found the Sheath-bills (*Chionis minor*) so troublesomely tame that he was often obliged to kick them out of his way, and when he hid himself behind a rock they would come out and peep over at him and chatter, and seem quite pleased at having found him again!

No account of the ways of the Dodos as observed by the earliest discoverers of their island—that is to say, the Portuguese—has come down to us, but at the end of the sixteenth century the island was rediscovered by the Dutch, who found the birds still in possession. Thenceforward voyagers vied



BIRDS IN MAURITIUS THREE HUNDRED YEARS AGO

When Dutch voyagers landed on the island of Mauritius, three hundred years ago, they found it inhabited by dodos and parrots, which were so tame that they could be struck down with sticks. There were also huge tortoises in whose carapace, we are told, ten men could sit at one time. This illustration is from a woodcut published in 1601.

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with each other in describing the Dodo's uncouth appearance, and some of them drew pictures of it. One of these drawings, the first that was ever published, appeared in a book of travel, called *India Orientalis*, by the two brothers de Bry, in the year 1601, and it gives such an admirably quaint representation of the doings of the early explorers that we have had a copy made, which you will see on the opposite page. It is called "How the Hollanders found immense Tortoises in the island of Mauritius." One of these huge animals, with a carapace like a neatly built brick dome, is shown in the foreground, marching along in a very business-like way as though he was in a hurry to get rid of the two gentlemen armed with halberd and flint-lock who are seated on his back, like passengers on the 'knifeboard' seat of an old-fashioned omnibus. Ten other members of the party are holding a picnic in the empty carapace of another tortoise.

But for us the real interest of the picture lies in the birds. After describing to what an immense size the tortoises grew, the author goes on to say: "In the same Island they found a very large number of Parrots and Pigeons which were so tame that they knocked them down with sticks. Other birds were seen besides, which the Dutch called *Walckvögel*, and they brought one with them to Holland." Everything except the Pigeons is shown in this delightful picture. There are the Parrots, and the men striking them down with clubs; one man is filling a sack with them, to the obvious annoyance of his latest captive, who appears to be resenting the indignity in a very outspoken manner. There, too, between the trees on the left and down by the water's edge, are the *Walckvögel*, which are none other than our friend the Dodo. *Walckvögel* means *nauseous birds*, and they were so called, it is said, because no sort of cooking made them palatable. But it was admitted that their breast was tender, so perhaps they were only nauseous by comparison with the abundant fainty food which this island paradise afforded—such, for

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instance, as the Parrots, of which the larger kinds are said to be very good eating.

The representations of the Dodo in this print are distinctly flattering so far as gracefulness is concerned, but they hardly do justice to the bird's delightful grotesqueness. Living specimens were brought by navigators to Europe and were painted by a celebrated artist named Roelandt Savery, and others. Many of the portraits made at this time are still in existence, and they show a clumsy-looking bird rather like a very fat chicken of immense size (for the Dodo was about three feet long), with short legs, absurdly small wings, a no less absurdly large beak of a very curious shape, and a tuft of curly feathers sticking up very high on the back by way of a tail. In de Bry's illustration the legs are far too long, the body is too slender, and the head and bill are not nearly large enough; while the curly tail is not shown, though there is just a suggestion of it in the bird whose back is turned to the halberdier landing from a boat, who appears to be about to chastise the *Walckvögel* for receiving a visitor so discourteously.

An original drawing made by a draughtsman on board one of the Dutch fleets which visited the island a few years later also shows the bird devoid of a curly tail-tuft, and, though I have nowhere seen it suggested, it seems just possible that this form of decoration was only found in the adult birds, and was perhaps possessed only by males.

In 1628, an Englishman named Emanuel Altham wrote from Mauritius to his brother at home: "You shall receue . . . a strange fowle: which I had at the Iland Mauritius called by ye portingalls a Do Do: which for the rareness thereof I hope wilbe welcome to you." Whether this bird ever arrived we do not know; but ten years later one of several specimens which were probably brought alive to Europe was exhibited as a show in London. There is in the British Museum an old manuscript written by Sir Hamon L'Estrange, which says: "About 1638,

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as I walked London streets, I saw the picture . . . of a strange fowl hong out upon a cloth . . . and myselfe with one or two more Gen. in company went to see it. It was kept in a chamber, and was a great fowle somewhat bigger than the largest Turkey Cock and so legged and footed but stouter and thicker and of a more erect shape, coloured before like the breast of a young Cock Fesan and on the back of a dunn or deare coulour. The keeper called it a Dodo and in the ende of a chimney in the chamber there lay an heap of large pebble stones whereof hee gave it many in our sight, some as bigg as nutmegs and the keeper told us shee eats them conducing to digestion and though I remember not how farre the keeper was questioned therein yet I am confident that afterwards shee cast them all agayne."

Perhaps this was the bird the embalmed body of which afterwards passed to the Ashmolean Collection at Oxford. Unfortunately it became mouldy and eaten by insects, and in course of time the Vice-Chancellor and Proctors of the University ordered that it should be destroyed. The curator, however, cut off the head and one foot and kept them. This head and foot, another foot in the Natural History Museum in London, a skull in Copenhagen, and a number of bones and skeletons dug from the mud of a lake in Mauritius, are about all we have left of the Dodos. For at least two and a quarter centuries past, no man, it is thought, has seen one alive. The final cause of its downfall was—pigs! Pigs were introduced into Mauritius; they ran wild, and increased at such an alarming rate that in 1709 the inhabitants organised a grand hunt and killed more than five hundred in a single day. But the pigs had already destroyed the most interesting of the native animals.

Mr. Belloc's lines on the Dodo, in *The Bad Child's Book of Beasts*, may well stand as an epitaph on these quaint birds:—

The Dodo used to walk around,
And take the sun and air.
The Sun yet warms his native ground—
The Dodo is not there!

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That voice which used to squawk and squeak
Is now for ever dumb—
Yet may you see his bones and beak
All in the Mu—se—um.

Some birds still living are not even so well endowed with wings as was the now extinct Dodo. The queer little Kiwis (*Apteryx*) of New Zealand, which hide in burrows by day and only come out by night to run about sniffing for worms, have wings so small that they are altogether concealed amidst the fur-like plumage in which the body is clothed. These birds are related to the Ostriches but do not exceed a large domestic Fowl in size, and as they have no efficient means of defence they would probably have become extinct before now but for their nocturnal habits. Unhappily, it is practically certain that they cannot survive many more years, owing to the destructiveness of the stoats and weasels which have most unwisely been introduced into New Zealand with the intention of reducing the number of rabbits. The rabbits of course flourish and multiply in spite of this vermin, just as they do in England.

The *Apteryx* has the distinction of laying a relatively larger egg than any other living bird. The largest eggs that have ever been discovered, however, are those of the extinct Ostrich-like bird of Madagascar, the *Æpyornis*, which measure more than a foot in length and are large enough to contain two or three gallons of liquid, or about as much as a hundred and fifty hens' eggs. A fine specimen of these gigantic eggs was found with the skeleton of some chief, in whose lap it had apparently been placed at burial, with the idea of furnishing him with an ample supply of food during his journey to another world. They probably gave rise to the story of the colossal Roc, mentioned by the traveller Marco Polo and celebrated in the *Arabian Nights*, which, according to the legend, could carry an elephant in its clutch. This wonderful story was further embellished about two hundred years ago by a French writer who

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described how the inhabitants of Madagascar had to take tame tigers about with them for protection against the terrible birds!

We do not know very much about the *Æpyornis*, but a great deal has been discovered about somewhat similar birds, the gigantic Moas of New Zealand. The Moas were probably the largest birds that have ever inhabited the earth, though they laid much smaller eggs than their relatives in Madagascar. Their leg-bones are larger than those of a dray-horse, and if we can judge by comparison with the Ostriches of to-day—mere chickens by contrast—they must have been capable of delivering a terrible kick. Devoid of wings, they strode through the sombre forests in the far-off ages before the Maoris arrived in New Zealand, looking down upon man and beast from a height of twelve or fourteen feet, and leaving imprints in the soft earth a foot and a half in length. No doubt these giant birds were hunted by the Maoris for food, for the earliest European explorers of New Zealand found Moa-bones in plenty lying about the surface of the ground, especially near the old cooking-places of the natives, and often showing traces of the action of fire. In one district pieces of skin and feathers were also found. Legends of the way in which Moas were cooked still survive; but the exact reason why the birds became extinct remains a mystery.

One day a man who was ploughing an exposed patch of rising ground unearthed a large bone, which he sent to Dr. Forbes, at that time Director of the Christchurch Museum at Canterbury, New Zealand. It proved to be a Moa-bone, and on digging down in the place where it was discovered, Dr. Forbes found the remains of no less than six hundred Moas of all sizes, together with those of Geese, Ducks, and Birds-of-Prey, all buried in a narrow space scarcely thirty yards long. How they came to be there nobody can tell, for even if a great herd of Moas had been overwhelmed by some sudden catastrophe it is not easy to account for the presence amongst the dead of such excellent fliers as Hawks and Ducks.

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We stated a few pages back that the ancestors of the Dodo were probably able to fly, but that their wings gradually became smaller until at last they were incapable of raising the bird's heavy body from the ground. We cannot enter here into all the reasons for believing this, but we can say that the most ancient bird of which we know anything at all had well-developed wings. This very remarkable and interesting bird, of which two fossil specimens have been found, both in the lithographic slates of Solenhofen in Bavaria (you may see one of them in the Natural History Museum at South Kensington), is called *Archæopteryx*. About the size of a Rook or large Pigeon, it was in many respects very different from any bird now existing. It had no beak, but its jaws were armed with teeth, set in sockets like those of the crocodile. Then it had three distinct and separate fingers on each wing, whereas in all living birds the parts of the fingers which remain are tied together.

The tail of *Archæopteryx* was as peculiar as its head. What we usually speak of as a bird's tail is merely the feathers on the tail; the real tail has for its foundation a bony plate, the end of the backbone, on which the feathers are supported in the form of a fan. In the quite young chick, before it leaves the egg, we can see that this bony plate is formed from six or seven separate bones, one behind another, which eventually all become compressed into one single bone; but in *Archæopteryx* this had not taken place. The tail was long, made up of many bones, like that of a lizard, and each bone carried a pair of feathers, one on each side. In fact, this little creature resembled a lizard-like reptile, but it was a true bird, because it had well-developed feathers, not only on its long tail, but also on its fore-arms and hands and thighs. Naturalists have good reasons for believing that all birds are descended from reptilian ancestors, and there is no more striking evidence of this than the reptile-like peculiarities of *Archæopteryx*.

Not very many years ago, birds with teeth still existed on the

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globe. These interesting birds were relatives of the Dodo, but did not at all resemble that clumsy bird in appearance, except in having a rather heavy bill. Like the Dodo, however, they were island dwellers and had forgotten how to fly. Their home was in Samoa, and the natives, who called them *Manu-mea*, used to preserve them; in fact, one of the chiefs had a hut in the bush where they were fed daily.

The *Manu-mea* is known to naturalists as the Tooth-billed Pigeon (*Didunculus strigirostris*), and specimens are to be seen in museums; one in the Natural History Museum at South Kensington is about the size of a rather fine domestic Pigeon. Though it had perfectly formed wings it used to live almost entirely, if not altogether, on the ground, for it had no natural enemies in its island home. As Samoa became more civilised, however, the natives began, like other civilised folks, to make pets of cats, which they obtained from ships visiting the islands. But pussy (the natives adopted not only the pet, but also the name) did not care much for her new master's diet, which consisted chiefly of yams and similar vegetable food, so she began to go hunting in the woods on her own account. "There," says Mr. Gosse, "she met with the feeble-winged *Didunculus* scratching the soft earth for seeds, and with a purr and a mew soon scraped acquaintance with the stranger. Pussy declared she loved him well, and so she did—too well, in fact; she felt 'as if she could eat him up';—and *did*. The news soon spread among the tabbies that there were sweet birds in the woods, and the result is the almost total disappearance of poor *Manu-mea*."

At this critical time the *Didunculus* seems to have displayed a quite unusual amount of intelligence, for those birds which escaped being actually killed and eaten learnt that the ground is a dangerous place when there are cats wandering about, and took to feeding, building, and roosting on high trees. It is not often that birds learn such a lesson soon enough to profit by it, but the *Didunculus* appears to have been an exception to the

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rule, for just when it was on the point of extinction it began once more to increase in numbers. It is said to survive to this day, but I have not met with any very recent accounts of it being actually observed in its native home.

The survival of the Tooth-billed Pigeon of Samoa is, however, not more remarkable than the extinction of its cousin, the Passenger-Pigeon (*Ectopistes migratorius*) of Eastern North America, which was not only an admirable flier, but existed until a few years ago in numbers beyond all computation. One colony seen by the naturalist Wilson was estimated to contain more than 2230 millions, and a single nesting-place in a Kentucky forest was several miles in breadth and upwards of forty miles in length. In this immense tract *nearly every tree* was furnished with nests wherever there were branches to accommodate them.

The multitudes of Pigeons observed by Audubon early in the last century were no less amazing. In the region of the Ohio, in 1813, he one day found the *flocks* which were passing overhead so numerous that he could not keep count of them; he noted one hundred and sixty-three in twenty-one minutes. "I travelled on, and still met more the farther I proceeded. The air was literally filled with Pigeons; the light of noon-day was obscured as by an eclipse . . . and the continued buzz of wings had a tendency to lull my senses to repose.

"Not a bird alighted; for not a beech-nut or acorn was to be found in the neighbourhood that year; they passed high overhead. At sunset they were still passing in undiminished numbers, and this tremendous procession continued for three days. The people were all in arms, and multitudes of birds were destroyed; no other flesh was eaten for a week; Pigeons were the sole topic of conversation. There must have been billions of birds—an army requiring millions of bushels of food every day."

Great parties of gunners, provided with carts, camped beside the woods where the Pigeons nested, and slaughtered millions

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of them without producing any appreciable reduction in their numbers. But in time organised persecution had its effect; thirty years ago the birds, though still common, were no longer enormously abundant; and at the present time, the only living representatives of this once multitudinous species are a few birds in an aviary! Thus in North America the greatest herds of animals—the ‘buffaloes’ of the prairies—and the most amazing flocks of birds which have peopled the earth in the memory of man, have been annihilated by reckless slaughter.

CHAPTER XXI

WISDOM AND FOLLY

Imagination, memory, and intelligence in birds—Mischievousness and practical joking—A Raven's strategy—Comparative intelligence of Crows and Rooks: the plumage test—Dog *versus* Magpies—Bird-burial—Parrots and monkeys compared—A Parrot biography—A case of insanity—Longevity of Parrots and Ravens.

IT was formerly the fashion to regard man alone as a reasoning animal and to look upon all other living creatures as practically devoid of intelligence, but endowed with a certain gift called instinct, which enabled them sometimes to act in an intelligent-seeming way, though quite without the aid of reason. But this convenient and simple theory was found not to work very well, because there are many actions performed by animals which seem to be the outcome of something which it is really impossible to distinguish from reason; and so the pendulum of opinion, of popular opinion at least, began to swing to the opposite extreme, and every natural-history book and many magazines contained a multitude of stories illustrating what was now called the marvellous 'intelligence' of animals.

Quite recently, however, some well-known writers have returned very nearly to the old attitude towards this question, and would attempt to explain every animal action as the outcome of instinct. It is impossible to inquire closely into the matter without coming to the conclusion that the truth lies somewhere midway between the two extremes, and that many animals are certainly endowed not with instinct only, but with intelligence and a capacity for simple reasoning. Amongst

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these a place is clearly due to the highest types of birds, and it will be interesting to consider in what way birds show the power of reasoning and the possession of intellectual faculties. This is not the place to enter into a philosophic discussion of the subject, so I will merely choose a few simple illustrations and stories of incidents observed by naturalists and others who can be relied on not to have added imaginative touches for the sake of making their stories more picturesque.

That some birds have undoubtedly the gift of imagination is quite clearly shown by the fact that they dream; Parrots even talk in their sleep. That they have intelligence is shown by the way in which they avoid danger or obtain food in circumstances so unusual that they could not possibly be overcome by means of instinct; and that they have memory every one is well aware, for it is common experience that they return to the spot where they are fed, and that many kinds imitate sounds which they have heard, while others repeat words, sentences, or even whole songs.

The Parrot family and the Crow family run one another close for the pride of place as regards intellectual capacity, and I think that it will be best for us to consider that the honours are pretty evenly divided between them.

Crows have excellent memories, and Wilson mentions an instance of a tame Crow which had escaped from captivity, and which eleven months afterwards left a flock of its own kind, amongst which it was flying overhead, and alighted on its owner's shoulder as he stood one morning by a river. The bird gabbled with great volubility and was evidently pleased to see its old friend again, but it would not allow itself to be caught, and after an exchange of greetings it returned to its companions.

Crows and other species often show a considerable degree of intelligence in their manner of feeding. Tame Crows, for instance, discover for themselves that hard crusts can be softened and made more palatable by dipping them in water,

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and some of them regularly practise this trick. A tame Herring-Gull which was in the habit of catching Sparrows in the garden where it was kept, but which found them rather inconvenient objects to swallow, owing to their feathers (and the Herring-Gull, it may be remarked, is by no means a fastidious bird), used to carry its captives to a pond close by and dip them in the water, after which it found less difficulty in bolting them.

Both Crows and Gulls when feeding on the seashore have very often been observed picking up whelks and other shell-fish and flying with them to a certain height, whence they let them fall upon the rocks in order to break the shell, afterwards alighting to pick out the soft morsel thus deprived of its covering. Audubon saw a Herring-Gull treat a particularly hard mussel in this way three times, flying on each occasion to a greater height before it eventually succeeded in its object. The Bearded Vulture has for centuries had the reputation of dealing in the same manner with large bones in order to get at the marrow, and it is said that in the Levant these birds crack the shells of tortoises in the same way. If that be true, it may perhaps be the origin of the story concerning the manner in which *Æschylus* met his death.

The common Curlew is a bird which does not as a rule appear to be exceptionally intelligent, yet one of these birds has been known to behave in a way which showed that it was by no means devoid of the capacity to plan an action requiring a certain amount of reasoning power, when the all-important question of food was concerned. The bird, Montagu tells us, had been captured after being disabled by a shot in the wing. In a day or two, when it had recovered from the first shock of its misfortune, it began to eat worms which were offered to it, but as there was sometimes difficulty in obtaining a sufficient supply of these to satisfy its needs, it was thought desirable to attempt to induce it to do without animal food and to live on bread and milk, like the Ruffs which were at that time captured

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and fattened for the market. To accustom it to the change, worms were at first mixed with its mess of bread and milk, but the bird did not take kindly to the dish and used very cautiously to pick out the worms one by one and carry them to a pond, where it washed them thoroughly before eating them. After a week or so, however, it became reconciled to its new diet, and soon grew plump on it.

Returning now to the Crow family, we find that the tricks and antics of Ravens indicate not only a good deal of intelligence, but a sense of humour as well, or if not humour, a very considerable capacity for amusement at the expense of other animals by the practice of all kinds of mischievous tricks. A pet Raven will often make the life of a dog almost unbearable by teasing him, pulling his tail, pecking him when he is least expecting it, and meeting his growling protests with impudent abuse in the Raven language. He is far too agile and wily a bird ever to be caught, and the dog invariably comes off second best in the encounter and is often compelled to slink away in search of some quiet corner where he vainly hopes to be left in peace.

Intelligence is most clearly shown, however, when two or more Ravens join to carry out what seems to be a carefully planned strategy. Many instances of the kind are recorded, but as we shall have to give a striking example when speaking of Magpies, we will not refer further to them here.

All Ravens are clever thieves and show a great deal of mental alertness in the way in which they immediately take advantage of a favourable opportunity of carrying on their depredations. A pair of the Alaska Ravens observed by Mr. Littlejohn nested on a small island amidst a colony of Gulls on whose eggs they to a large extent subsisted. By joining forces whenever they detected the Ravens intent on thieving, the Gulls were able to protect most of their eggs; but when Mr. Littlejohn visited the island the whole colony would take fright and, for the time being, leave their nests unguarded. This was the

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Ravens' opportunity, and no sooner had the Gulls taken flight than they got to work and carried away one egg after another to the mainland, where they hid their spoil carefully in the moss. They did not waste time in feasting on the eggs then, but just went on robbing the nests as quickly as they could until the visitor had departed and the Gulls returned, when they went over to the mainland to enjoy their plunder in peace and to conceal more effectively the eggs which they could not eat at once.

When foraging on the seashore, Crows sometimes carry small fish above high-water mark and conceal them there beyond the reach of the tide for future consumption. One species of Crow (*Corvus splendens*) which is found in Ceylon possesses quite an unusual amount of ingenuity. Many birds are very curious by nature, but these Crows are especially so. They will open paper parcels to find out what is inside them, and will even untie the knots in a napkin containing sandwiches or other food. One bird mentioned by Tennent cleverly pulled out the peg which fastened the lid of a basket, in order to plunder the provender within.

There is little doubt that both Crows and Rooks are able to distinguish between a gun and a stick. You may approach the edge of a ploughed field where the birds are feeding and raise a walking-stick to your shoulder, and for some time hardly one of them will condescend to notice you, but if you attempt to get within range carrying a gun the whole flock will rise in a moment and not alight again until they have got away to a safe distance.

The inhabitants of rookeries situated near houses are sometimes credited with forming an attachment for the people who live there. How far this is true there is no very reliable evidence to show, but in one case certainly a few pairs of birds left an old rookery in order to found a colony in a clump of elms which grew a mile away beside a house to which their former human neighbours had removed. On the other hand, some

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Rooks which had been prevented from building in the trees standing in a garden beside a certain house entered into possession of the coveted site within a few days of the time when the family who objected to their presence left the neighbourhood, although a gardener and his family still remained as caretakers in charge of the house.

It is well known that some young birds have plumage of a sort quite different from that of their parents, while others are at once clothed in the adult plumage, and it is found to be generally true that the latter birds have reached a much higher state of development than the former. Indeed, the rapidity with which a young bird assumes the adult plumage is regarded as a fairly safe test of its standing in the bird world. Now young Crows do not put on any special kind of baby clothing; their first suit is indistinguishable from that of the old birds, except that it is not quite so glossy. Young Rooks, on the other hand, are occasionally, though very rarely indeed, more or less spotted; so if the above theory be correct we must consider that the Rook is not quite equal in development and intelligence to the Crow, and experience goes to show that this is the case.

Magpies are as cunning as Ravens and hardly less intelligent. Captain Bendire, a noted authority on North American birds, after long observing Black-billed Magpies (*Pica pica hudsonica*) very closely, was forced to the conclusion that they are the possessors of very considerable reasoning powers, and he gives a remarkable instance in support of his opinion, showing how several of these birds combined forces in order to carry out an elaborate stratagem which one bird could not have worked out alone.

He states that while stationed at the Nez Perce Indian Reservation in Idaho, a place where Magpies are exceedingly abundant, he possessed a fine setter dog which used to accompany him on all his excursions and was of great assistance to him in finding nests. This dog he himself regularly fed every

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evening, giving him, towards the end of his meal, a well-boiled soup-bone with a certain amount of meat attached, by way of dessert. The dog was made to carry his bone on to the lawn, while his master sat in the porch watching him. This had not been going on very long before it was noticed that on each occasion when the dog appeared with his bone, within a minute or so about half a dozen Magpies would be close beside him, although shortly before not one of those birds had been in sight. The Magpies lost no time, but immediately took up positions around the setter and were ready for business. One of them stood just in front of the animal's nose, about two feet away; a second stationed himself behind, within easy reach of the tail; and the others stood by his side. Waiting until the dog had begun to gnaw his bone, the bird in the rear would make a vicious peck at his tail. The setter, much enraged, would wheel round in an attempt to revenge himself on the offender, who would fly in a leisurely way just out of reach, luring the dog after him as far as possible. While this little ruse was being enacted the other Magpies used to help themselves to pickings from the bone. So frequently was this ingenious stratagem carried out that Captain Bendire became familiar with the appearance of the different birds, which could be distinguished from each other by their variation in size, or length of tail, or by some particular defect of plumage. This led to a still more remarkable discovery, for he found that when the dog had returned to his interrupted meal a different bird would undertake the harassing tactics, while the bird which had previously been "it," as the children say in their games, occupied the place of honour in front of the dog's head, ready to run in and obtain its share of the spoil. At last the setter, who was an intelligent dog, began to see through the manœuvre, and no little persuasion was required to make him stay on the lawn, for he would have preferred to carry his bone into the porch, where he was safe from annoyance. Such a striking example of strategy as this, supported by most reliable authority, seems



MAGPIE STRATEGY

Magpies used to surround a dog every evening as he lay gnawing a bone after his supper. One of the birds then pecked viciously at his tail, and while he wheeled round and dashed after the offender, the other magpies helped themselves to scraps of meat from his bone.

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unquestionably to indicate both intelligence and reasoning power on the part of the birds, which not only formed a plan of attack, but discovered the only means by which they could accomplish their purpose.

Birds-of-Prey seldom show any very remarkable signs of originality in their methods of hunting, but even amongst them examples of clever ruses are not unknown. A pair of Caracaras in Texas were once seen endeavouring to secure their prey in a manner which was decidedly artful. One of the birds concealed itself behind a tussock of grass, while the other began to dance (a favourite pastime of these birds) just in front of a young lamb, trying to lure or drive it from the place where its mother was grazing towards the spot where its own companion was in hiding. The plan seemed quite likely to succeed, but at the critical moment the sheep became alarmed by its offspring wandering so far away and summoned it back.

A few instances of the burial of dead comrades by birds are on record, but how far they show the possession of intelligence it is difficult to say. It seems scarcely possible, however, that an action so unusual can be due to instinct alone.

For several years in succession a certain pair of Cliff-Swallows, members of a small colony, occupied a nest which was built against the rafters of a loft. One spring the Swallows returned as usual to the old home, and all seemed to be going on well until a certain day, when several birds were noticed walling up the entrance. As soon as this had been finished the foundations of a new nest were laid over the old one. On the closed chamber being broken open for the purpose of ascertaining the reason for the birds' action, a dead Swallow was found inside, the bird having apparently died a natural death. Oven-birds, which build remarkable two-chambered nests of clay, of a shape which has been compared to that of a baker's oven, and which are fairly common in some parts of South America, have been

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known to convert a nest into a sepulchre by hermetically sealing the opening in the same manner.

We have already referred to the intelligence of Parrots, which may be regarded as holding much the same position among birds as that occupied by monkeys among animals. Indeed, they resemble monkeys in many ways. Both are quick in discernment, both are active and cautious, both are quick of temper, malicious, and thoroughly spiteful. A Parrot delights in monkey-tricks, and like the monkey has an excellent memory, especially for injuries. Both Parrot and monkey are as cruel as they are clever, and as fickle as they are at times affectionate. A Parrot, like a monkey, is an excellent mimic and a born actor, and like a monkey, is endowed with intelligence in no small degree. Many Parrots, as is well known, are capable of acquiring quite an extensive vocabulary and stock of phrases, and though we use the term 'to learn like a parrot' as an expression of contempt, there is little doubt that the Parrot does not always utter the sounds which it has learnt to imitate without attaching any meaning to them, but that it sometimes associates them with definite ideas. We must not understand by this, of course, that the bird knows the meanings of all the phrases which it learns; but neither does it use them all in what is commonly called parrot fashion. It often attaches definite significance to the *sounds*, other than words, which it repeats, and that I think is what we should expect, since the imitation of natural sounds may be regarded as the simplest form of speech. Years ago I often noticed a Parrot which hung in a window in one of the side streets off Holborn, near a place where omnibuses frequently pull up. This bird had learnt to imitate the shrill whistle used by some of the conductors as a signal to the driver to move on, and took evident delight in the result of its mimicry when, as sometimes happened, it succeeded in putting an omnibus in motion. Another amusement which is not uncommon among Parrots, and which shows undoubted intelligence, is to imitate a house dog's voice and so

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set the animal barking, afterwards telling it to "Lie down" or "Be quiet," just as its master would do.

It is hardly necessary to repeat the many famous and well-known Parrot stories in order to illustrate the memory and wit of these surprising birds, but it does seem worth while to give a quite brief account of one bird as an example of its kind. Parrot stories are often looked upon with suspicion, so I will be careful to choose one on the perfect accuracy of which I am able to rely.

The Parrot in question lived in the home of a friend of mine at the time when she was a schoolgirl. When first Polly arrived she was quite young, and her vocabulary was limited to such simple remarks as "Hallo!", "Good-bye," and the inevitable "Pretty Polly." There were, however, five lively children in the house, and the bird very soon began to pick up new words and seemed to become more intelligent day by day. At the end of two years she knew every member of the household by name, she had learnt to whistle very creditably, and was fond of singing. Besides all this she could laugh and cry to perfection. A favourite game of hers when left alone was to cry lustily until one of the children ran upstairs to see what was the matter, for it was quite impossible to tell whether it was a child or the Parrot who was crying. As soon as any one arrived on the scene the bird burst into fits of laughter, in evident enjoyment of the success of its practical joking. Opposite a window where the Parrot was often placed there was a boys' school, and Polly after a while picked up the name of one particularly mischievous youngster, and used to greet him genially whenever he put in an appearance. Often when she was put outside on the balcony she would startle the passers-by by suddenly calling out, "Look out! Look out!" Like all Parrots, she was very fond of attention; if she felt that she was being neglected she would first rattle the bars of her cage to attract notice, and if that did not prove successful she would walk to and fro apparently in the greatest dis-

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tress, whimpering and muttering to herself, "Poor Polly! Poor, poor Polly!" continuing to do so until one of the children consented to play with her. Eventually the bird received some slight injury to the head, and after bemoaning her illness in a very human way for a day or two she died.

The cleverness of such birds as Parrots and Ravens is not more remarkable than the silliness of some other species, such as the Tinamous, which allow themselves to be readily taken by a horseman riding around them in narrowing circles, or the various birds which have earned amongst sailors the unenviable titles of 'Fools' and 'Boobies.' Even actual insanity appears to be not altogether unknown, judging from the extraordinary behaviour of a Fantail Pigeon mentioned in *Mental Evolution in Animals* by Romanes, who gives the story as it was related to him by a lady:—

"A white fantail pigeon lived with his family in a pigeon-house in our stable-yard. He and his wife had been brought originally from Sussex, and had lived, respected and admired, to see their children of the third generation, when he suddenly became the victim of the infatuation I am about to describe. . . .

No eccentricity whatever was remarked in his conduct until one day I chanced to pick up somewhere in the garden a ginger-beer bottle of the ordinary brown stone description. I flung it into the yard, where it fell immediately below the pigeon-house. That instant down flew paterfamilias, and to my no small astonishment began a series of genuflections, evidently doing homage to the bottle. He strutted round and round it, bowing and scraping and cooing and performing the most ludicrous antics I ever beheld on the part of an enamoured pigeon. . . . Nor did he cease these performances until we removed the bottle; and, which proved that this singular aberration of instinct had become a fixed delusion, whenever the bottle was thrown or placed in the yard—no matter whether it lay horizontally or was placed upright—the same ridiculous scene was enacted; at

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that moment the pigeon came flying down with quite as great alacrity as when his peas were thrown out for his dinner, to continue his antics as long as the bottle remained there. Sometimes this would go on for hours, the other members of his family treating his movements with the most contemptuous indifference, and taking no notice whatever of the bottle. At last it became the regular amusement with which we entertained our visitors to see this erratic pigeon making love to the interesting object of his affections, and it was an entertainment which never failed throughout that summer at least. Before next summer came round he was no more."

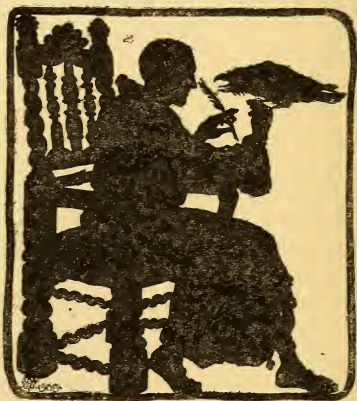
With the exception of monkeys, about which we cannot speak with certainty, the most intelligent species of animals, such as the elephant, often reach a great age. In the case of domesticated and captive animals it is possible to get accurate records, and it is known that many dogs and horses have reached quite respectable ages; they are, however, easily beaten by such birds as Parrots and Ravens. Levaillant mentions a Grey Parrot which had lived in the family of a Dutch gentleman at Amsterdam for seventy-three years. When Levaillant saw it, it had become very infirm, and was kept alive by frequent snacks of biscuit dipped in Madeira wine. It was blind and had lost its memory, which began to fail at the advanced age of sixty, when it also became confused in its speech. In its prime this bird had been a great linguist, and had even been trained to make itself useful in the house by calling the servants and fetching its master's slippers when requested to do so. At sixty-five its moulting became irregular, and like many old gentlemen it grew a little eccentric in its dress, the orthodox red tail being replaced by a yellow one, which proved to be its last change of plumage. A very old Parrot of the Macaw kind, mentioned by another writer, became entirely grey late in life.

Crows and Ravens are notoriously long-lived, and tame Ravens have been known to outlive several successive owners.

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The great age attained by birds of this family is celebrated by the author of *Festus* in one of his songs :—

The crow ! the crow ! the great black crow !
He lives for a hundred years and mo' ;
He lives till he dies, and he dies as slow
As the morning mists down the hill that go.
Go ! go ! you great black crow !
But it's fine to live and die like a great black crow.



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